Food Manufacture

Incorporating Canning, Packing, and Preserving

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Another Russian Mystery.

OVER A month ago it was announced that a shipment of 150,000 cans of Russian pork and beans was made to this country, and they were said to be as good as either American or English packs. Over a month ago, also, it was stated that the Canners' Committee of the National Food Canning Council were "at present taking action." Since then both beans (and pork?) and the Council appear to have vanished into thin air. Where are they? The matter is really serious, judging from the information that has reached us from direct sources regarding the canning conditions in Russia. We fear that the "action" may be one which calls for flowers!

Citrus Problems.

An institution has been established at Winter Haven, Florida, for the investigation of technical problems relating to the citrus industry. The work to be carried out will include the problem of cull and surplus disposal. Attention will be directed to the development of a satisfactory method of arresting or retarding the deterioration of the pulp and the expressed juice. This is a difficult problem, especially as there are types of spoilage peculiar to the product; moreover, the oils are subject to rapid chemical changes which are reflected in the delicate aroma. These changes in the oil occur even after treatment by heat, cold, or preservatives. Although the U.S. Department of Agriculture has made progress, the problem has not been definitely solved.

The difficulty is increased owing to our lack of knowledge regarding the chemical nature of the compounds to which the delicate flavours and aromas of citrus fruits are due. It is, however, known that they vary in character and stability with the type and maturity of the fruit. The Department of Agriculture found, for instance, that in one variety of oranges the flavour was of such a delicate and unstable nature that a marked change occurred within thirty minutes after pressing the juice from the fruit.

Fish Sausages.

An American contemporary reports that the famous "red hot" will have a competitor in the form of a fish Frankfurter—a "seagoing red hot," in fact. It is understood that haddock, cod, and hake are being used for the purpose, and that the fish are spiced and smoked. Experiments are in progress to turn out a "fish" Bologna.

The Aluminium Debacle.

A determined "clean-up" of the aluminium "racketeers" is being made in true Chicago style—although not altogether in accordance with the best traditions of chemists, who are well known for their mild and peaceful disposition. It is evident, however, that aluminium has a most peculiar shattering effect on the scientific nervous system, miraculously changing the most docile person into a raging monster from whom no quarter may be expected. In fact, the mere mention of "aluminium" is sufficient to cause set teeth, taut muscles, and bristling hair, and if the latter happens to be red (as is frequently the case) the effect is somewhat startling.

It can be well imagined that under these circumstances the general feeling is decidedly hostile towards those who have been reckless enough to range themselves on the side of the anti-aluminiumists. The only trouble is (at least in our view, as we had hoped to witness a first-class slaughter) that these gentlemen have evidently sensed the danger in good time and have beat a hasty retreat without firing a single shot. The result has been a completely bloodless victory for the chemists, who take full possession of the field.

We hope they will now set to work to consolidate the ground they have won, particularly on the physio-

logical side. For instance, more precise data are required on the effects of aluminium in its various states of combination. It is all very well to review the literature; that is never quite convincing. Once again we ask the question: Who is going to do some more experimental work?

The above remarks do not refer to any particular body of chemists. The movement is almost world-wide. In America and Germany the position is much the same as in this country. On page 209 are summaries of papers recently presented in London. They are excellent and serious contributions to the subject. Especially are Dr. Lampitt and his colleagues to be heartily congratulated on the thorough and painstaking work they have carried out. Certainly it is far in advance of anything previously attempted, and it is a shining example of what can be accomplished in the way of scientific work of the first order by the technical staff of a food manufacturing concern. The industry is also under a deep debt of gratitude to Dr. Burn for his able summary of the physiological literature.

Aluminium Outclassed.

Now that the would-be destroyers of aluminium are suffering from the effects of having been somewhat heavily "sat on," they will no doubt be looking round for new pastures. Fortunately for them, aluminium is not the only metal to be found in foodstuffs. We commend to their notice some recently published results of work by Newell and McCollum on the spectrographic analysis of marine products (Bureau of Fisheries, Investigational Report No. 5). There it is stated that in a group of marine products the following elements were detected in considerable amount: Calcium, iron, magnesium, phosphorus, potassium, and sodium. Traces of aluminium, chromium, copper, lead, lithium, manganese, strontium, fluorine, nickel, silicon, silver, tin, titanium, and zinc were also found.

We were greatly disturbed by the harrowing accounts of certain old ladies' symptoms before they discarded their aluminium pans, and ran over our various "points" with some trepidation. If the aluminium gentlemen do happen to switch over their patients on to fish boiled or fried in composite metal pans, the resulting symptoms will, we imagine, beggar all description!

Grape Fruit Marmalade.

Segal and de Kiewiet describe a defect in South African marmalade containing grape fruit, consisting of a distribution throughout the product of small white spots (*J. South Af. Chem. Inst.*, 1931, p. 43). At first these were thought to be due to the presence of mould growths, but further examination showed them to be minute clusters of white crystals. If the bottled marmalade was immersed in boiling water for a time, the crystals disappeared and did not visibly re-form. The purified crystals had m.p. 171° C., and the empirical formula $C_{21}H_{24}O_{11}$, which agree with similar data for the glucoside naringin. On hydrolysis, naringin gives the ketone naringenin, 2:4:6-trihydroxy-phenyl-4′-hydroxy-styryl ketone.

The Buyer.

"The typical buyer," Elbert Hubbard once said, "is a man past middle life, spare, wrinkled, intelligent, cold, passive, non-committal; with eyes like a codfish, polite in contact, but at the same time unresponsive, cool, calm, and as damnably composed as a concrete post or a plaster-of-Paris cast; a human petrification with a heart of feldspar and without charm or the friendly germ, minus bowels, passions, or a sense of humour. Happily they never reproduce, and all of them finally go to Hell."

Now *Advertising and Selling* asks, "Will some buyer (preferably not typical) please tell us the outstanding characteristics of the typical salesman?"

Catfish Leather.

The Department of Fisheries for Canada has received samples of skins prepared from catfish caught in Nova Scotia, which had been sold to a U.S. firm of leather manufacturers. The skins were soft and pliable, and were dyed in several colours.

Insect Infestation.

According to E. M. Mrak of the Fruit Products Laboratory, California, in a report at the Dried Fruits Conference held last year at the University of California, insects get into the cartons of dried fruit after packaging as a result of improper protection of the package, and not at the time the fruit is put up.

In an effort to obtain some data on the effect of the type of carton on insect infestation and losses from evaporation, a preliminary series of packaging tests was started a year ago by P. F. Nichols, H. M. Reed and Mr. Mrak, in co-operation with the California Prune and Apricot Growers' Association.

Tight sealing with paraffin wax greatly retards the attacks of insects.

Snails in Ginger Beer.

Another aspect of this subject is provided by the recent decision given in the House of Lords, when, by a majority of 3 to 2, their lordships allowed the appeal of a woman who had claimed £500 from an aerated water manufacturer. The claim was in respect of shock and illness which it was said she suffered as the result of drinking ginger beer which she alleged contained a snail. Food and drink manufacturers cannot be too careful.

Sauce Bottles.

A correspondent asks: "Why do sauce manufacturers all use tall, wobbly bottles, especially in view of the fact that these are about the only food containers that reach the table?" We are quite at a loss for an answer to this question, unless the idea is to provide waiters with an opportunity to display their dexterity. It is certainly a surprising instance of conservatism.

Another point that strikes us as curious is: Why do sauce manufacturers hide their sauces under a label that is plastered over every available part of the bottle? Is this a surprising instance of modesty, or does it signify some obscure relation (direct or inverse) between the size of the label and the quantity of sauce in the bottle?

Modern Foods Condemned.

In a recent issue of the *J.S.C.I.*, Professor H. E. Armstrong hurls some thinly veiled invectives at the Royal Society, the Chemical Society, medical science, food manufacturers, and others. Particularly did he shake his fist at the food manufacturer. "In every direction our food is being tampered with and lowered in value by powerful trade organisations, to serve commercial ends." And in another place: "Modern flour is all but deprived of them" (vitamins). And again: "A fourth great danger is the rapidly increasing use of preserved foods of all kinds —little as we know, it is clear that these are of inferior value to fresh foods."

With all due respect to Professor Armstrong, we fear he is not very familiar with the results of recent researches and the workings of the modern food factory. We would, for instance, refer him to the researches of the American food chemists on the vitamin values of preserved foodstuffs, and to the remarks we have made in this journal from time to time. "We must have our wheat whole," says the Professor. By all means! No one will have the slightest objection, but it is not everyone who has the digestion of a flour mill and mash tun combined, and there are few with the extraordinary vitality enjoyed by the learned Professor.

Fruit Preservation.

The question of preserving fruits by some form of coating or dipping process is one that crops up periodically. Recently we came across the following summary of B.P. 368,822 which is interesting in this connection.

This invention relates more particularly to the preservation of citrus fruit, apples and tomatoes, which may, by dipping, spraying or brushing, be coated with a film containing monovalent alkali ichthyosulphonate, preferably ammonium ichthyosulphonate (ichthyol), dissolved partly or wholly in a suitable carrier such as a non-oozing oil, petroleum jelly, lanoline, or a drying liquid—*e.g.*, albumin, or a solution of gelatin or vegetable gum. In the example given, 90 parts of petroleum jelly and 10 parts of ichthyol were brushed over the oranges which were then wrapped in paper.

Fish Glazing.

The U.S. Bureau of Fisheries has been investigating the possibility of substituting a coating of cottonseed oil for the ice glaze usually applied to frozen fish to prevent their drying while in storage.

In his work, Mr. Lemon found that a coating of vegetable oil applied to fish prior to freezing prevented drying in storage to a much greater extent than did an ice glaze. While he did not undertake to give cost data, he declared that the experiment indicated the cost of oil glazing did not exceed the usual ice treatment.

Four vegetable oils were employed in the tests, hydrogenated cottonseed oil, untreated cottonseed oil, corn oil, and peanut oil. The first mentioned proved most effective in the prevention of drying, but untreated cottonseed oil was close behind and was considered as the best of the four oils because of ease of application, transparency of the coating, and the good results given. All of the oils proved much superior to ice glazing.

U.S. Dairy Industry.

In a report prepared by the staff of the U.S. Bureau of Agricultural Economics (issued in August, 1931, by the U.S. Dept. Agric.) the outlook of the dairy industry is discussed. The severe declines in the prices of dairy products in the last two or three years are causing dairymen, it is stated, to reconsider their production programmes, and far-reaching adjustments are essential. It is, for example, interesting to note that the price of butter in the period 1926-1929 was about 45 cents a pound, but towards the end of this period the price started to decline rapidly, reaching 25 cents a pound in 1931—a decline which is largely attributed to changes in the consumers' incomes.

The report concludes with an appeal for further research into the factors affecting the demand for various dairy products, and attention is drawn to the fact that practically no investigation has been undertaken into the determination and measurement of the factors influencing the employment of dairy products in the manufacture of baking, confectionery, and similar products.

Rice in Feeding Stuffs.

In a report recently compiled by Sheets and Semple for the U.S. Department of Agriculture, it is stated that the annual production of rice in U.S.A. has in-

creased in the last thirty years from about 100,000 tons of milled rice to more than 500,000 tons. Approximately 40,000 tons of rice bran, 15,000 tons of rice polish, and at least 10,000 tons of brewers' rice are available annually for livestock feeding.

It is stated that brewers' rice and rice polish have practically the same feeding value as corn in a fattening ration, except that in the feeding of hogs the quantity of rice polish must be limited on account of its tendency to produce soft pork. Rice polish appears to be equal or slightly superior to ground rice for the production of milk.

Mussels.

It is stated in a report issued by the U.S. Bureau of Fisheries that fresh-water mussels supply the pearl-button industry with its raw material, amounting to 30,000 tons of shells annually.

I.F.S. Duties.

The recently introduced package duty on every package which contains any food (other than fresh fruit), drink, cosmetic, or medicinal preparation, into the Irish Free State is causing considerable alarm amongst English manufacturers who send out their products in packets. The tariff provides that if such food, drink or medicinal preparation is prescribed in the official import list to be entered on importation by weight, and the weight of the package is under 7 lb., a duty of 2d. is imposed on packages which do not exceed 2 lb., and an additional penny on every extra pound or fraction of a pound. If the importation is by measure, 2d. for two pints and 1d. for every additional pint or fraction of a pint.

The Finance Minister in imposing this tax referred to the practice among large distributing firms of importing their commodities ready packed for sale and stated that this reduced employment in the Free State. "We should at least be allowed to pack and parcel for ourselves the foreign foodstuffs which we are compelled to eat." This sets up a very anomalous position; a penny packet of spice will now cost 3d. in the I.F.S., if packed in England; a 2d. bag of flour will become 4d., but, on the other hand, if the package contains an expensive article worth, say, £1 and weighs under 2 lb. the price will only be 20s. 2d. Thus an iniquitous burden is being placed on the small packets of cheap material, and obviously the poorer classes in Ireland will suffer as they buy in small quantities, and many of the packaged articles sold in the Free State cannot be produced there. In addition, the foreign manufacturer will not be allowed to send over to the Free State in bulk, and packet the material there. He will still have the same duty to pay.

The imposition of the duties is already causing inconvenience and several manufacturers have had consignments returned to them. An interesting point arises which seems to have been missed by the Free State Minister: What is a package? Is a sealed carton a package unit, whether it is filled with a powder or, say, with a gross of small packets? An interesting speculation and possibly a means of evasion!

Blue Spots in Flour.

Doubtless some of our readers have at one time or another come across small blue spots in flour or bread; at any rate, we are informed that the incidence of such spots has been noted in the milling industry for many years and apparently no satisfactory explanation has been supplied.

The correspondence column of our contemporary *Milling* is doing its best in the way of explanations. Some weeks ago "Interested" wrote for an explanation of the spots, and the following week we learned from "Student" that they were caused by a tiny blue stone imported in Australian wheat, and when ground up with the wheat the size of the particles is so small that they appear white, but later, when water is added in baking, the stone particles diffuse and cause the discolouration. We thought that ended the matter, but the following week "Interested" informed us that the mill in question had had nothing to do with Australian wheat for ten years! Another explanation was that the blue spots were due to the dust from copying ink pencils—in our opinion a not unlikely one. Another correspondent had imagination—"they might be caused by a small quantity of the blue colouring matter used for icing sugar finding its way into the bread trough."

Some think it possible that the spots come from the yeast containers which are sometimes printed blue, others again from stones in Indian and Jugo-Slavian wheat and, finally, small seeds found in South American wheat, particularly Chilian and Argentine, are blamed.

So even now we don't know exactly what causes these blue spots. It doesn't seem a very important matter anyhow. Perhaps some of our readers have their own views in the matter.

Milk Sugar.

It has recently been shown by Leighton and Leviton of the research laboratories of the U.S. Bureau of Dairy Industry (*Journ. Phys. Chem.*, p. 523, February, 1932) that the addition of cane sugar in suitable amounts to skim milk before condensing markedly lowers the viscosity of the highly concentrated product, and that by the addition of an optimum quantity the viscosity is reduced to the point where lactose crystallisation can take place readily and where separation of the milk sugar crystals by mechanical means is feasible.

Parliament Buildings, Ottawa—The Scene of the Empire Economic Conference.

FOOD COLOURS AND EMPIRE TRADE

SPECIALLY CONTRIBUTED
By H. STANLEY
REDGROVE, B.Sc., F.I.C.

THE USE of artificial colouring matters (coal-tar dyes) for colouring foodstuffs is now a firmly established and almost world-wide practice, and the number of different foodstuffs which contain traces of these materials is now very large indeed. There can be no possible objection to the practice, providing the dyes used are non-poisonous and are manufactured under such conditions as ensure their freedom from poisonous impurities, such as arsenic and lead.

The fact should, perhaps, be emphasised, in view of a certain prejudice which still exists, that there is no reason whatever why a colouring matter should be injurious because it is of synthetic rather than of natural origin. Indeed, not all natural colouring matters are harmless. Gamboge, whose use in foodstuffs is specifically forbidden in Great Britain and in many other countries, provides an instance of a natural colouring matter which is emphatically not harmless.

Unfortunately, although there certainly are numerous artificial colouring matters which are perfectly harmless when manufactured under stringent conditions, there is relatively little definite information available on the subject based on actual experimentation. Weyl's classical work on *Die Teerfarben* (Berlin, 1889), translated by Leffmann (*The Coal-Tar Colors*, Philadelphia, 1892), deserves to be better known than appears to be the case. Possibly an element of doubt concerning Weyl's conclusions is introduced by the fact that he experimented on animals, which do not always react in the same way as human beings. Cazeneuve and Lépine conducted some experiments on the human subject; and their results are of great value, but badly need extending, as the number of dyes investigated was quite small.

In consequence of the lack of extensive exact knowledge, wide differences of opinion exist as to what dyes are suitable for use in foodstuffs. As a result, regulations are in force in various foreign countries and British dominions of a most diverse character.

The divergences exhibited by the foreign regulations may, for the moment, be set aside. Those exhibited by the regulations in force in various parts of the Empire are of a more serious character. They undoubtedly act as barriers to the growth of Empire

trade. In spite of all the difficulties which exist—and it would be folly to attempt to ignore them—efforts ought to be made to eliminate these divergences, so that what was considered wholesome, or alternatively was condemned, in one British dominion or colony, would bear the same character throughout the whole Empire.

Is it too much to hope that efforts towards this end might be made at the Ottawa Conference?

Colour in foodstuffs is an important sales-factor. But it is more than this: it is a stimulant to appetite and hence has a real hygienic value. The food manufacturer, however, who wishes to export his products to various parts of the Empire, is faced with a grave problem. A colouring matter which is permitted in one dominion is forbidden in another. A chaotic state of affairs exists in Australia, where each State has its own regulations differing from those of others.

On the question of purity—*i.e.*, limits of arsenic, lead, etc.—general agreement ought not to be difficult to attain. It is when we approach the question of what specific dyestuffs are suitable that the difficulty arises.

Two totally different policies exist. In Great Britain, the use of five specific coal-tar dyes is definitely forbidden. These dyes are Picric Acid (7), Victoria Yellow (8), Manchester Yellow (9), Aurantia (12), and Aurine (724), the number in parenthesis, in each case, being that of *The Colour Index*, issued by the Society of Dyers and Colourists in 1924. Apart from these five dyes, any coal-tar dye may be used, provided it is harmless, an important provision, but one of a most unsatisfactory nature and liable of abuse, in view of the scantiness of precise information as to what dyes are harmless.

The regulations in force in the Union of South Africa follow along lines similar to those in operation in Great Britain. In India, the writer is informed, there are no specific regulations dealing with foodstuff colourings.

On the other hand, Canada, New Zealand, and the various Australian States have adopted the plan of drawing up lists of permitted colours, the use of any coal-tar dye not on the list being prohibited.

Other factors, in addition to a belief in the harmlessness of certain dyes, have operated in the selection. In some instances, at any rate, the ease with which a particular dye can be detected has acted as a factor in favour of its inclusion. This character is undoubtedly of importance, as there is little point in including a particular harmless dye if, chemically speaking, it is hard to distinguish from a noxious one; whereas, if only dyes having well-defined analytical characters are permitted, infringements of the regulations can easily be detected.

The question, too, of what dyes are manufactured in a particular country has also played a part in determining the selection. Canada has obviously been influenced by the U.S.A. This factor should be subordinate to more important considerations. There is no valid reason why every desirable dyestuff should not be produced in the mother-country.

Recently (July, 1931) the New South Wales list of permitted dyes has been enlarged so as to include all coal-tar dyes, with one exception (Croceine Scarlet 5R, *C.I.* No. 280), permitted in other Australian

S. and J. No.	*C.I.* No.	Name of Dye.	Canada, 1928 (amended 1930).	New Zealand, 1924.	New South Wales, 1931.	Victoria, 1930.	Queensland, 1928.	S. Australia, 1928.	W. Australia, 1928.	Tasmania, 1924.
		Red Shades								
—	31	Azogeranine, Kiton Red G, Acetyl Rose 2GL			x	x	x		x	
—	57	Lissamine Red 6B, Amidonaphthol Red 6B, Kiton Red 6B, Acetyl Rose 6BL			x	x	x		x	
55	79	Ponceau 2R			x	x	x		x	
56	80	Ponceau 3R	x	x	x	x		x		x
—	85	Benzyl Bordeaux B			x	x	x		x	
103	179	Carmoisine, Cardinal 3B			x	x	x		x	
107	184	Amaranth, Brilliant Bordeaux B	x	x	x	x	x	x	x	x
106	185	Brilliant Scarlet 4R, Brilliant Ponceau 5R			x	x	x		x	
130	225	Chlorazol Pink Y, Rosophenine 10B, Rosophenine Pink, Azomine Fast Pink B			x	x	x		x	
163	280	Croceine Scarlet 5R				x				
448	677	Roseine, Magenta			x	x	x	x	x	x
504	749	Rhodamine B			x	x	x		x	
515	771	Eosine BS, Eosine Scarlet			x	x	x		x	
517	773	Erythrosine	x	x	x	x	x	x	x	x
520	777	Rose Bengale			x	x	x		x	
		Orange Shades								
85	150	Orange I	x	x	x	x	x	x	x	x
86	151	Orange R			x					
		Yellow Shades								
4	10	Naphthol Yellow S	x	x	x	x	x	x	x	x
16	19	Butter Yellow	x							
—	22	Yellow AB	x	x	x	x				x
11	24	Sudan I	x							
—	61	Yellow OB	x	x	x	x				x
94	640	Tartrazine, Tartar Yellow, Acid Yellow 79210, Tartratol Yellow	x	x	x	x	x		x	x
425	655	Auramine O			x	x	x		x	
		Green Shades								
—	662	Brilliant Green Crystals Y			x	x	x		x	
433	666	Acid Green G, Guinea Green B			x	x	x		x	
435	670	Light Green SF, Yellowish	x	x	x	x		x		x
—	—	Fast Green FCF			x	x				
		Blue Shades								
209	289	Coomasie Navy Blue, Cyanine Navy Blue			x	x	x		x	
—	518	Chlorazol Sky Blue FF, Paramine Sky Blue FF			x	x	x		x	
—	661	Turquoise Blue G			x	x	x		x	
480	707	Soluble Blue			x	x	x		x	
692	1180	Indigo Carmine, Indigo Carmine Disulphonic Acid	x	x	x	x	x	x	x	x
—	—	Disodium Salt corresponding to Aphazurine FG (*C.I.* No. 671)	x							
		Brown Shade								
197	331	Bismarck Brown			x			x		x
		Violet Shade								
451	680	Methyl Violet			x	x	x		x	
		Black Shades								
601	861	Induline			x	x	x		x	
602	865	Nigrosine (water-soluble)			x	x	x		x	

States. This is certainly a step towards unification. Whether it is a right step may, of course, be debated. It may be thought that some of the Australian States have too easily granted entry to their lists to dyes whose entire harmlessness has not been completely demonstrated.

Orange R (*C.I.* No. 151), included on the New South Wales list, is presumably identical with Orange II., which Weyl found to be decidedly poisonous. Eosin BS (*C.I.* No. 771), included on four of the Australian lists, one would be inclined to view with suspicion, failing definite evidence to the contrary.

The whole subject is undoubtedly a most difficult one, and the question of unification would seem to call for the setting up of a committee of experts. But that unification is necessary in the interests of Empire trade there can be no shadow of doubt.

Pending unification, the annexed Table may be of use to food manufacturers. It gives the names of the dyes permitted for use in foodstuffs, subject to certain provisions, in Canada, New Zealand, and the Australian States, and also *The Colour Index* numbers and those of Schultz and Julius (*Organic Colouring Matters*, translated by Green, London, 1904). One or other of these numbers is usually affixed to each dye in the various regulations, as an aid to precision. A cross ("X") indicates that the dyestuff is on the permitted list of the country in question. As already intimated, similar lists do not exist for Great Britain, South Africa, and India.

Regarding Naphthol Yellow S (*C.I.* No. 10), a dye whose harmlessness is well established, it should be noted that this is sometimes called "Naphthol Yellow," as on the New South Wales list. The use of the latter name should not be encouraged, as it is also applied to Manchester Yellow (*C.I.* No. 9) which is definitely poisonous.

Apart from its practical utility, the Table may serve to illustrate the wide divergences between the various regulations in force in various parts of the Empire. Out of the thirty-eight dyestuffs listed, only five can be used in *all* of the following countries: Great Britain, South Africa, India, Canada, New Zealand, and all the Australian States. These dyes are Amaranth (*C.I.* No. 184), Erythrosine (*C.I.* No. 773), Orange I (*C.I.* No. 150), Naphthol Yellow S (*C.I.* No. 10), and Indigo Carmine (*C.I.* No. 1180). These five dyes are quite sufficient for colouring all types of foodstuffs and for producing all requisite shades.

Labels for Cans

A CASUAL visitor to the Nations' Food Exhibition at Olympia must have been struck by the lack of originality in most of the can labels. Often one found excellent fruit, carefully graded and well packed, displayed for sale beneath labels that had no virtue of design or visual appeal. Generally these were representations of the contents of the can indifferently pictured and printed in three or four colours.

Surely this is at once foolish and uneconomical. No one will deny that one of the most effective methods of publicity is to portray the goods themselves realistically and effectively, but surely no one who was not already familiar with the excellent contents would be tempted by these flat and uninteresting berries or these artificial, two-dimensional fruits. The contrast between many of these and the simple yet excellent labels of the best of the American fruit canners was striking.

One suspects that many of the labels represent the pick of a number of roughs submitted by some printer whose desire, naturally enough, is to induce the customer to print in as many colours as possible in order to give him the maximum profit. They could hardly have been designed by an artist. And yet there are in London many first-class advertising agencies and studios who could design a more arresting label in two colours, or even one, and whose charge for such service would soon be recovered in the saving effected in printing costs.

The writer's personal opinion is that a striking design showing the contents even in a conventionalised form is more arresting and productive of sales than an indifferent attempt at naturalism. However, in art, wherever there are two men there are three opinions and this represents one point of view only. But in printing costs figures speak for themselves, and in these days of forced economy they speak loudly and clearly.

Another point in the design of labels of which little account has apparently been taken is suitability of reproduction in press advertisements where the screen is coarse, the reduction considerable, and the contrast generally blurred. A design of, say, rich purple loganberries against a dark background would stand little chance in a small advertisement in most of our great dailies where, as presumably they sell to, or at any rate instruct, the general public, they would be likely to advertise.

This oversight is all the more remarkable as our canners and bottlers generally take great pains to obtain, and pay high prices for, the best available talent and advice in production and distribution. Surely a little more care in the presentation of the goods themselves would help them to achieve their declared aim to "Sell more British"!

L. F. E.

[The above recalls some remarks recently contributed to the *Star*, London, by an Englishwoman stationed on an island in mid-ocean. "Here, in this little island in the Central Pacific, our isolation is nearly complete. Very few ships visit us. We are a mere handful of people driven to such devices as reading the very labels on the tins and bottles in our store-cupboards for relaxation and entertainment. To you who live in a land where there are cinemas and public libraries and reading rooms in every town and city, and in many a village, too, this may seem inconceivable. Hard though it may be to believe, it is, nevertheless, the simple truth.

"It is only when you are situated as we are on this lonely island that you begin to appreciate the literary attainments of mere labels. Some, of course, are very ordinary, bearing nothing save the actual names of the contents of tin or bottle. . . ." —EDITOR.]

The Manufacture of Pure Malt Vinegar » »

PART II

By W. Warren, B.Sc., F.I.C., and T. McLachlan, A.C.G.F.C., F.I.C.

The second part of a comprehensive account of the manufacture, properties, uses, etc., of pure malt vinegar.

Sterilisation.

ALL BREWING operations are of a biochemical nature, dependent on the growth of certain strains of organisms on a suitable medium, and the success or failure of any process of this kind is dependent on the control of the correct cultures and the elimination of any deleterious growths. No one in his senses would ever suggest that all the animals in the Zoological Gardens should be set at liberty and allowed to settle among themselves which are the fittest to survive, and yet this is almost the position adopted by many vinegar brewers until recently. It was mentioned earlier that after mashing the malt it is necessary to chill the wort rapidly, otherwise lactic and butyric acids are formed; this is, of course, the result of a fermentation of the wrong type caused by lactic acid bacteria.

Continental brewers have great difficulty in controlling the growth of vinegar eels owing to the lower temperatures at which they work their acetifiers, and they were at one time so accustomed to their presence that Pasteur had difficulty in persuading them that the presence of these eels was not an actual necessity for the correct brewing of vinegar. Another type of growth with which the brewer has to contend is that known as "Mother-of-Vinegar," a peculiar zooglœal condition of the bacteria, due to their growth in a very limited supply of air.

In the event of vinegar eels or mother gaining control of a brewery, the only known method of eradicating them is to empty away the whole of any liquors in the brewery, to sterilise everything with sulphur dioxide, and to start again from the commencement. It is the practice of some brewers to sterilise their vinegar by heat before filling into casks or bottles in order to kill any *mycoderma aceti* organisms remaining in the vinegar, and to prevent their growth in a limited supply of air with the consequent formation of mother in the barrel or bottle. It is even argued by these brewers that the flavour of the vinegar is improved by this treatment, although the authors cannot say that this is in accordance with their experience. It would seem much more logical to acetify the vinegar under such conditions that most of the food required by the bacteria is utilised during the actual brewing; there is then little tendency for them to multiply at a later stage. This is achieved most readily by keeping the vinegar for some time in vats after removal from the acetifiers, and after this, if a proper filter has been employed, all bacteria should be removed during this process. In the ordinary way *mycoderma aceti* are always to be found in the air, and it was formerly the custom to allow fermentation to set in spontaneously; this was due to adventitious bacteria and yeasts falling into the vat.

It will be realised, therefore, that the absolute sterility of vinegar is an impossibility in the case of vinegar put up in casks, and it is the contention of the authors that if the vinegar is not correctly brewed in the first place it will become infected and give rise to mother at some period later on during storage.

Where trouble is experienced with bottled vinegars, pasteurisation may be carried out after bottling, as is customary in France, but it seems possible that a better method would be to saturate the vinegar with carbon dioxide. This method is already in use for the preservation of beer and mineral waters, and it is used very largely for the preparation of certain solutions used in medicine, such as those containing adrenaline, which is very easily oxidised. A special label could be attached to the bottle, if necessary, advising the final purchaser to release the stopper for a short time before use in order to allow the carbon dioxide to escape. On the other hand, there seems no particular reason why this should be done, as the palatability of the vinegar would probably be enhanced by the presence of carbon dioxide.

Composition of Vinegar.

It has already been pointed out (p. 163, June, 1932) that it is now impossible to tell how a vinegar has been prepared, and it may be useful to give some idea of what exactly takes place during the brewing of vinegar from malt. According to the variety of malt employed and the temperature of mashing, anything from 55 to 60 per cent. of the malt is rendered soluble and taken into solution, but to give some idea of the general confusion which exists as to what actually takes place, some authorities state that if the wort is boiled after mashing the nitrogen will be higher than if it is not boiled. In reality the exact opposite is the case, since, if the wort be boiled, a coagulum is formed, and it will be found that this consists largely of the nitrogenous constituents of the wort, and as much as 10 per cent. or more of the albumens may be precipitated in this manner. It is also said that if a low temperature is employed for mashing the nitrogen is low. Here, again, this is contrary to experience; a rise of 10° F. may actually give a mash with only two-thirds of the nitrogen that is obtained at a lower temperature.

The Mash Tun Room.

A Portion of the Vinegar Generating Room showing the Tops of Two Acetifiers—One of which has been Uncovered.

The Vinegar Ageing Store.

As regards phosphates, the all-important factor appears to be the water employed for the mash, and it has been shown that a soft water will give a wort containing one and a half times as much soluble phosphate as a very hard water.

As originally extracted from the malt, the wort will contain about 15·5 per cent. of soluble solids, and these will be made up approximately as follows:

Dextrose	2·4	to 3·5	per cent.
Maltose	6·6	to 9·0	,, ,,
Other fermentable sugars	0·1	to 0·8	,, ,,
Dextrin	2·0	to 3·3	,, ,,
Protein matter	0·73	to 1·8	,, ,,
Ash		0·33	,, ,,

The proteins will be made up more or less as follows:

Primary and secondary proteoses	14	to 20	per cent.
Peptones	20	to 40	,, ,,
Aminoacids	40	to 60	,, ,,
Ammonia		Nil.	

The reason for dealing with the distribution of the nitrogen in the wort will be apparent when the composition of the finished vinegar is discussed.

A genuine malt vinegar should have the following composition:

Specific gravity ...	1·0155	to 1·022	
Acetic acid	5·1	to 6·1	per cent.
Total solids	1·7	to 2·5	,, ,,
Proteins	0·4	to 0·9	,, ,,
Ash	0·2	to 0·3	,, ,,
Phosphoric anhydride	0·04	to 0·10	,, ,,
Alcohol	0·2	to 0·5	,, ,,
Fixed acids		0·4	,, ,,

The fixed acids, in the case of malt vinegars, consist of a mixture of organic acids, chiefly tartaric and succinic acids, and the important ingredients, which are seldom determined at all, are the esters. The latter play the principal part in the aroma of the vinegar.

According to Mitchell, the primary and secondary proteoses of vinegar are only about one-tenth of the total protein, and about one-tenth exists as ammoniacal nitrogen, but Mitchell also gives figures showing that the original wort contains about one-tenth of the nitrogen as ammoniacal nitrogen, which is quite contrary to the author's experience, when dealing with a genuine malt wort. It is, however, instructive to note the great loss of protein during the process of fermentation, yet, in spite of this loss, the greatest amount of nitrogen absorbed by yeast during its growth is derived, not from the wort, but from the air itself; in fact, both yeast and acetic acid bacteria may be grown on media containing only a little ammonia and no protein.

Strength of Vinegar.

In common with many other commodities, vinegar has been the subject of legislation on more than one occasion, usually with a view to the granting of licences or the levying of duties; both of these methods being adopted for the increase of the national exchequer. The Vinegar Act of 1818 defined "proof" vinegar as being of such strength that 100 parts of the liquor required 14½ parts by weight of crystallised subcarbonate of soda to neutralise it. This is equivalent to about 5·6 per cent. of acetic acid by weight. With the repeal of the duties the term became obsolete, but vinegar is still sold by

Filtering Vinegar.
On the left is shown a filter cake just taken from the hydraulic packer.

numbers in the trade, these numbers being 16, 20, 22, and 24. Their origin appears to be wrapped in obscurity; whether they were related to the price in pence per gallon or not is uncertain. Some authorities claim that they were connected with the old proof system, No. 24 vinegar being the same as proof vinegar. At the present time it is customary for No. 24 vinegar to be decidedly stronger than the old proof vinegar, as is shown by the following table:

No. 16	...	...	...	4·14 per cent.
No. 20	...	...	...	5·18 ,, ,,
No. 22	...	...	...	5·70 ,, ,,
No. 24	...	...	...	6·21 ,, ,,

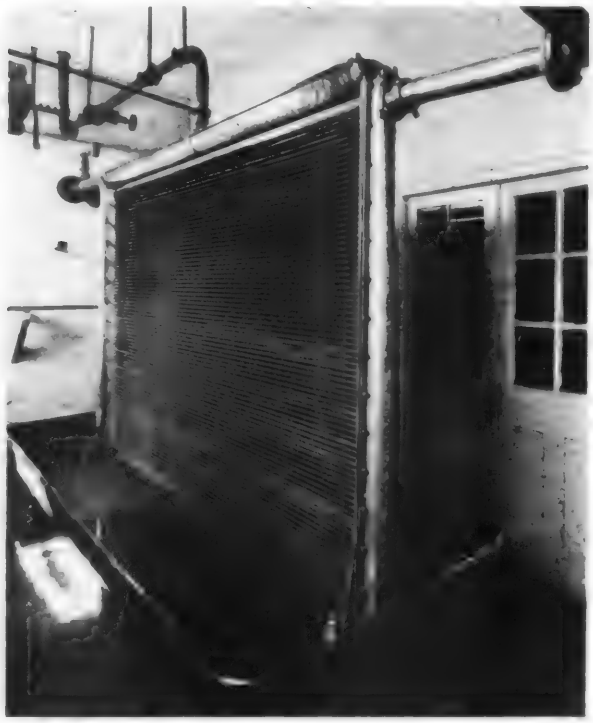
These figures are derived from the explanation of Muspratt that No. 24 vinegar requires 24 gr. of pure dry sodium carbonate to neutralise a fluid ounce. They are not universally accepted by all brewers, and, as a result, the percentage of acetic acid may be anything up to 0·7 per cent. less than the above figures. Unless one is buying from a firm with a good reputation and according to a guarantee, it is therefore obvious that a chemical examination is necessary.

Although the Vinegar Act of 1818 allowed the addition of sulphuric acid in the proportion not exceeding one thousandth part thereof by weight—*i.e.*, 0·1 per cent.—this Act was repealed in 1861, and it is now illegal to add any mineral acid to vinegar. The only reason why mention is made of this point is that certain foreign authors do not yet appear to have grasped the fact and it is still stated that English vinegar contains 0·1 per cent. of sulphuric acid.

Varieties of Vinegar.

Apart from malt vinegar there are several varieties; in fact, the very name vinegar signifies sour wine, indicating that originally it was derived from this source, and it is still maintained that the best vinegar and that with the finest aroma is prepared from wine. Vinegar may be prepared from either red or white wine, and in France wine vinegar is used in exactly the same manner as malt vinegar is in this country. Wine vinegar is always prepared by the slow vinegar process, which is costly and tedious, but, on the other hand, it is on account of the time taken during acetification that the proportion of esters is much higher in wine vinegar than in malt vinegar, and it is the esters which are responsible for the bouquet of a wine or spirit. It is still the custom in France to test the aroma of a vinegar by pouring a little out on to the palm of one hand, rubbing it in thoroughly with the other and then smelling the palms of the hands, and in conversation with an American authority recently it was learnt that this is considered the best method of testing the odour of a vinegar, essential oil, or perfume in that country, though to an Englishman it must appear a slow process, as not more than one sample can be compared at a time, unless there is a general show of hands among samplers. Wine vinegar contains anything up to 1·0 per cent. of unoxidised alcohol, otherwise the chief characteristics of wine vinegar are the presence of tartaric acid and inositol. Wine vinegars are slightly lævo-rotatory, and this may be used as a ready method of testing for the presence of glucose vinegar, which is dextro-rotatory, while glucose vinegar also contains dextrose. Wine vinegar is frequently distilled and sold as such. This product has a most agreeable aroma, and is very highly prized, though it is incorrect to sell it as white wine vinegar. Wine vinegar is also adulterated at times by the addition of dilute alcohol to the wine before acetification.

Cider vinegar is the recognised vinegar of America, though in France it is seldom sold pure on account



Portion of Refrigerating Room.

of its poor keeping qualities, due probably to the fact that French cider has an average alcohol content of 3·9 per cent. by volume, whereas American cider usually contains about 5·7 per cent. of alcohol. Cider vinegar has a brownish-yellow colour and on heating gives rise to a typical apple odour; its chief method of identification is the presence of malic acid. Until recently the slow process was almost universal in the United States, and about two years were required for the production of a good cider vinegar.

Other vinegars of the cider type are crab-apple vinegar and perry vinegar, but these are usually prepared in the country and are hardly of industrial importance. Banana vinegar has recently been described, the most interesting feature of this product being that *Saccharomyces ellipsoideus* is employed for the fermentation of the banana sugars to alcohol before acetification. The final product is stated to possess an agreeable banana aroma and flavour.

Milk or whey vinegar is prepared from skimmed milk, to which sugar has been added to produce sufficient alcohol and acetic acid.

Spirit or natural fermentation vinegar is rapidly becoming more popular, both in this country and on the Continent. It is prepared from weak alcohol of controlled strength, and it is claimed that it has a milder flavour, while, at the same time, containing more actual acetic acid; in fact, it is usually made to contain about 10 per cent. It is stated that this vinegar possesses the same vitamin value as grain vinegar, and, particularly when made from starch by the converter process, it is almost impossible to differentiate this article from malt vinegar. Spirit vinegar is largely used for pickling, as a substitute for malt vinegar, but it has the advantage that, owing to its greater acetic acid strength, it is less liable to undergo decomposition than malt vinegar.

It would be incorrect to attempt to describe the different varieties of vinegar without referring to what is commonly sold in the poorer quarters as "vinegar," which is prepared from dilute acetic acid coloured with caramel and, occasionally, flavoured with a little of the genuine article. Fermentation vinegars may be distinguished from synthetic vinegars by their luminescence in artificial light. This luminescence is said to be due to the products of bacterial decomposition, though distilled vinegars still show it to some extent, and vinegars which have been stored in casks show luminescence, due to the tannins extracted from the wood. In the authors' experience, all genuine vinegars reduce Fehling's solution, but it is very doubtful whether this is an infallible test, as it is a comparatively simple process to add a little glucose to an artificial vinegar in exactly the same way as one can add ammonium sulphate.

Uses of Vinegar.

Although vinegar is now used almost exclusively for condiment purposes of one type or another, it seems probable that it was first employed for its medicinal properties, having been used since the time of Hippocrates. At one time vinegar was largely used as a menstruum in medicine, but, owing to its variable composition, wine, cider, and malt vinegar have been almost universally displaced by dilute acetic acid of known strength, while even this class of medicines is giving way to other forms, which are found to be more attractive or to possess better remedial value. At the present time vinegar of squills is about the only name left in medicine which is still a household term. Nevertheless, a good vinegar possesses distinct antiseptic properties, and for this reason is used to a considerable extent in the preservation of fruits and vegetables, particularly the latter, which are sold under the name of pickles, sauces, chutneys, relishes, etc. Whether vinegar as such will soon be replaced in these preparations it is impossible to foretell at the moment, but, with the modern method of preparing goods to be stored for a long period before actual consumption, it has been found that the keeping properties are largely dependent on the acidity of the mixtures. Unless the vinegar brewer is prepared to raise the acetic acid content of his vinegar and also to make it constant in composition, it would appear that the time is not far distant when spiced dilute acetic acid will oust it from its present honourable position and help it to oblivion, much in the same way as has happened to various fruit wines, which are now only made in the country in small homesteads, though another type of article, which only resembles the original article in the name on the label, is rapidly gaining popularity.

The authors desire to express their thanks to the Hallamshire Vinegar Co., Ltd., for permission to publish the above views of their Brackley factory.

STANDARDS for JAM » »

The AMERICAN VIEWPOINT » »

ACTUAL EXPERIENCE OF BOTH ENGLISH AND AMERICAN CONDITIONS IS EMBODIED IN THE FOLLOWING ARTICLE

JAM, IN common with other manufactured food products, has been the subject of various regulations and definitions throughout the world in the last few years. Unfortunately, different countries have established different standards, arrived at apparently through different considerations.

Before discussing the specific differences observed in the countries bordering the North Atlantic, it is instructive to consider the principles on which standards for a product such as a jam can be based. The chief parties interested in these standards are the consumer, the manufacturer, and the food law authorities. Of these, the consumer should be the most important. It is only by satisfying the demands of the consumer that the manufacturer can continue his business, and it is only to protect the consumer that the food laws and their administrators have been created.

Unfortunately, the most important qualities from the consumer's point of view in a product such as jam are not susceptible to mathematical definition. It would be difficult to imagine in practice a board of expert jam-tasters set up to determine whether a given product should in fact be regarded as, say, strawberry jam, although theoretically this would be the ideal method of setting standards. From the consumer's angle the most important point is the appetite appeal of the product as judged by the flavour, appearance, and texture, considered in relation to the price paid for the jam.

First Quality Jam.

However, as the result of experience, there has been built up in each country the knowledge of what really constitutes a first quality jam, and manufacturers know that in order to make such jam a definite proportion of fruit to sugar must be used, concentrated to a definite degree, and in the interest of fair trading it seems reasonable that only products which are up to this standard should actually be labelled as jam. The food law authorities should reach the same conclusion in their efforts to ensure that the consumer actually gets what he has a right to expect when buying a jar of jam.

It is only fitting that England, which is regarded as the home of the jam industry, should lead the way in establishing reasonable standards for jam, worked out by co-operation between the manufacturers and the analysts responsible for the administration of the food laws.

Definitions and standards for jam and allied products have been in existence for some time in the United States and Canada. It is very difficult to reconcile the standards of the various countries, unless due consideration is given to the different varieties of fruit available and the different customs of the countries.

First quality strawberry jam, for example, in England must contain 42 per cent. of strawberries in the finished jam. In the United States, strawberry jam is included in the blanket definition for preserve, fruit preserve, jam, fruit jam—which is defined as the clean, sound product made by cooking to a suitable consistency properly prepared fresh fruit—cold pack fruit, canned fruit, or a mixture of two or all of these, with sugar or with sugar and water. In its preparation not less than 45 lb. of fruit are used to each 55 lb. of sugar. Although no mention is made in this definition of soluble solids in the finished jam, as compared with a minimum of 68 per cent. in the English definition, it is evident that strawberry jam as made in the U.S.A. will contain 52 per cent. or more of fruit. Canadian regulations give pure or first quality strawberry jam a special rating to contain 55 per cent. of fruit in the finished jam. The reason for these fruit contents, which seem high to English eyes, is to be found in the properties of the strawberries usually employed in jam making in North America, the fruit being much milder in flavour and possessing less body and pectin value than the English strawberry.

First quality black currant jam in England need only contain 30 per cent. of fruit in the finished product; Canadian regulations for jams, other than strawberry, require 50 per cent. of fruit in the finished

jam, and the United States would require the 45 per cent. fruit to 55 per cent. sugar ratio. Using English or European black currants this would result in a consistency resembling asphalt, but the explanation lies in the fact that black currants when grown in the United States are markedly deficient in pectin and flavour compared with the European variety.

Popularity.

It is interesting to note, by the way, that according to a survey made by the U.S. Department of Commerce, strawberry jam is by far the most popular jam in the United States, being made in amounts more than double its nearest rival, raspberry. Next in order of popularity come peach, blackberry, apricot, pineapple, cherry. Small fruits, such as gooseberries and currants, and stone fruits, such as greengage and plum, are very little used for jam or any purpose; even as jellies, red and black currant are outclassed in popularity by grape and the humble apple.

These few examples illustrate the difficulty of understanding the regulations prepared by foreign countries, and also emphasise the problems which confront a manufacturer who wishes to conduct an export business, even supposing he is able to overcome tariff obstacles.

Pectin and Fruit Acids.

It is not only in fruit content that the United States and Canadian regulations differ from the English. According to the English standards, small amounts of pectin, fruit acids, or fruit juices may be used, provided that the minimum fruit content is adhered to, and that a minimum soluble solids content of 68 per cent. is obtained, indicating a suitable amount of concentration. These additions are only made if a suitable marketable consistency or texture in the finished jam cannot be attained by fruit and sugar alone, and as it will obviously increase the cost to the manufacturer to make these additions there is evidently no intention here to attempt to deceive the purchaser. Provided the fruit content and degree of concentration are satisfactory, it is difficult to raise any objection to the use of small amounts of pectinous material to obtain the desired consistency, particularly in view of the fact that the quality of the jam would probably suffer in flavour and appearance if the attempt were made to get the same effect with fruit. However, the Canadian regulations specially provide for a declaration to be made on the label if fruit acid, pectinous material, or fruit juice is used. The United States regulations make no specific mention of pectin or fruit acids but, as in all the United States definitions for food products, it is implied that only the ingredients actually named in the definition shall go into the manufacture or composition of the product; therefore, it follows that pectin, fruit acids, and other fruit juices have no place in a jam in the United States.

Compound Jams.

The National Preservers' Association, corresponding in scope to the Jam Panel of the Food Manufacturers' Federation in England, has been making determined efforts for a number of years to obtain a modified definition, so far without officially being successful. In addition to the genuine jams or preserves, there are also on the market in the United States a number of "compound" jams selling at a lower price, which contain about half the fruit of a true jam, and it was felt that some standard of composition should be set for these products together with some suitable labelling. This class of jam would correspond roughly with the second quality jam allowed for in the English regulations. For some years the National Preservers attempted to get special legislation passed by Congress. This would have established standards calling for 45 per cent. fruit to 55 per cent. sugar, and a minimum soluble solids content of 68 per cent., with specific allowance for small amounts of fruit acid and pectinous materials. When these attempts proved unavailing, the Preservers' Association took advantage of the opportunity afforded by the MacNary Napes law passed in 1930, which outlined the setting up of standards for products packed in hermetically sealed containers, and efforts are now being made to have standards set up for jams under this Act, as well as for canned foods to which it specifically applied.

It seems probable that in the near future standards such as these outlined above will be adopted. In the meantime, some Government Departments have actually adopted the proposed standards in their own specifications for the purchase of jam.

Colour.

There are one or two other minor points of difference between the regulations of the various countries. In England, permitted colour may be added to the jam in small amounts, without label declaration. Canada and the United States insist on a label declaration if colour of any kind is used. As a matter of fact, colour is very rarely added in America to jam or allied products, as the public is accustomed to the use of uncoloured goods. In any case, as the chief raw material for jam is cold packed fruit, very little occasion exists for the use of colouring material.

Glucose.

It is interesting to note that the English regulations do not mention glucose, which, at one time, was a favourite bone of contention in all discussions of jam standards, but has now dropped from the limelight, presumably due to the relatively low cost of sugar.

The United States has recently approved the use of corn sugar on equal terms with cane or beet sugar in jam, but despite the fact that plenty of corn sugar of satisfactory quality is available at competitive prices, very few manufacturers have adopted it.

Other Jams.

No provision is made in the United States for mixed fruit jams, as only single fruit jams are customarily made; old favourites such as plum and apple or blackberry and apple being unknown. Com-

pound jams in the United States designate a class with a lower fruit content than genuine jam compounded with the necessary amount of acid sugar and pectin.

It is a little surprising to an outside observer to see no definition given in the English standard of "New Season's Jam." This magic phrase, one remembers, has a powerful sales appeal in England, and it would seem desirable to define how long a jam can be "New Season's Jam," and if this term should be applied simply to fresh fruit jam, or if reasonably fresh pulp could be included. This term is not used in the United States, where cold packed fruit and not fresh fruit or pulp is the principal raw material.

Bred Spred.

It seems probable that in view of the co-operative action of the manufacturers and the public analysts, adherence to the standard should be effectively attained in England. The record of the United States in securing compliance, even with the spirit of the law, has not been completely successful. What is known as the "Bred Spred" case has attracted a lot of attention recently. An ingenious manufacturer prepared a product which he named "Bred Spred," which was made in various flavours and contained less than half the fruit content of a normal jam, being brought to a suitable consistency by the judicious use of pectin, sugar, and acid. Although the manufacturer made no claim that the product was actually a genuine jam or preserve, yet, in the eyes of the trade and the public, the product was naturally regarded as in the same class, and the Government instituted proceedings against the manufacturer.

It was claimed that the article was misbranded, in that it imitated jam, a superior product, but as the manufacturer proved that his product was "Bred Spred" and not a jam, the use of this distinctive trade name enabled him to overthrow the Government's contention. The National Preservers' Association, representing manufacturers of genuine jams, naturally supported the action of the Government, but could not reverse the legality of the decision that by the use of a trade name the product was exempt from the definition for a jam.

This case helped to crystallise the views of the preservers in their effort to obtain more reasonable standards for jam, and illustrates a loophole in the existing definition in the United States. Incidently, the manufacturer in question did not apparently meet with continued success, and his plant is no longer operating.

Analytical Control.

No discussion of jam standards is complete without some reference to the difficulty of determining, by analytical methods, departures from the standards. The Research Association for the Cocoa, Chocolate, Confectionery, and Jam trades, in their interesting publication on the composition of fruits used in jam manufacture in Great Britain, have illustrated the method of calculating the approximate fruit content of a jam by determining the acidity, in soluble solids, pectin content, and other factors. Deviation from the standards by small amounts will presumably be difficult to detect analytically, but flagrant lowering of the fruit content can be determined by analytical methods, as has actually been done in various instances in the United States. In any case, it is difficult to imagine continued public support in purchasing the products of a manufacturer who persistently uses a subnormal proportion of fruit, as the shortage will necessarily be reflected in the quality of the jam, which is the final point in which the consumer is interested.

It is probable that much better enforcement will be obtained by a co-operative action between the manufacturers and the enforcing officials than by relying upon analytical detective work to trap the occasional wrongdoer. England has set an example in this instance, which manufacturers in the United States would be well advised to copy.

Preserving Apples for Mince Meat

By JOHN ELSBURY

THE actual preparation of mince meat will be discussed in a future article and examples of recipes will be given. The object of the present note is to describe briefly the method of preserving apples, bought when prices are low, in SO_2.

Care should be taken to see that the casks are clean and in good condition. Remove the head from the cask and fill with good, sour, cooking apples. Add two fluid ounces of a 5 per cent. solution of SO_2 to each gallon of the cask and head up. Fill with water and give the cask a roll in order to effect mixing. Store away under cover.

Apples so treated will keep for 12 months and will peel and core on the machine better than the raw fruit. They will also retain their colour. The peel and cores will make an excellent white juice which will jell as satisfactorily as juice obtained from fresh apples. Moreover, these preserved apples will make a good pulp or jam which is much brighter than that made by the old way of pulping.

The use of preserved apples in making mince meat saves time, steam, labour, etc. The fruit will withstand gentle boiling after being chopped up, and is added to the thick sugar syrup in the boiling pan and brought to the boil. The dried fruit is placed in the mixing tray and the syrup and apple added. The suet is, of course, added when the fruit mixture is quite cold.

THE MANUFACTURE OF COFFEE EXTRACT

A General Review of the Subject and a Discussion of the Technical Difficulties.

Coffee Blossom in Kenya.

AN ENQUIRER has asked for particulars of the manufacture of coffee extract ("coffee" or "liquid coffee"). The following is in the nature of a general reply. That it is necessarily general will be gathered from an appreciation of the difficulties involved on the technical side, and it may be stated at the outset that there is an urgent need for more precise information which can only be obtained by the application of organised research. Such research would certainly result in improved methods of processing and also a product superior to those commonly turned out at the present time. It should not be impossible to make an extract which will give a beverage at least equal to the one made in the usual manner direct from ground coffee. It appears to us that there is great scope in this direction.

Care must, first of all, be exercised in the selection of the most suitable variety and grade of bean. For example, one matter of importance is the extent of loss of the volatile constituents under the conditions existing during the process of concentrating the extract or "brew" by evaporation. Usually a mixture of beans, such as Costa Rica, Java, and Mocha, is used.

The control of heat during roasting is also important as this primarily determines the development of aroma. Control is also required over the fineness of grind; the finer it is the less the time and the lower the temperature required for extraction; at the same time, there is greater difficulty not only in the actual percolation and filtering operations, but also in cleaning the vessels employed in order to safeguard against fermentation and rancidity.

Undoubtedly the most difficult and vital stage in the preparation of liquid coffee is the extraction process. This is carried out either by agitating the ground coffee in tanks or by percolation. In both cases the quality, amount, and temperature of the water used, and also the time of extraction, must be carefully regulated. The extraction process should be carried out in such a manner that the maximum amount of soluble material is removed by the least possible quantity of water at the lowest temperature, in order to keep down the cost of subsequent evaporation and the loss of volatile, aromatic substances. It is stated that ordinary coffee beverage contains about 2 per cent. of dissolved materials, that the strongest direct extract obtainable contains about 11 per cent., and that 2·5 to 6 per cent. extracts usually result under commercial conditions. Another source of difficulty lies in the fact that water is tenaciously held by ground coffee; in order to wet 100 lb. of ground coffee about 20 gallons of water are required.

In the tank process of extraction the coffee is mixed with water in a tank fitted with a steam-coil, and then circulated by a pump. When extraction is judged to be complete, the mixture is run into a percolator, some shreds of filter paper (or cotton wool for small-scale work) having previously been placed at the bottom of the percolator. The process is assisted if pieces of filter paper are thrown into the percolator while running in the mixture of coffee and water. The first cloudy runnings are returned to the percolator.

In the percolation process the coffee is held on some form of filter bed and, compared with the quantity used in the tank process, a small quantity of water at the correct temperature (which is higher than that used in the tank process) is circulated over and through it. One obvious difficulty is the attainment of uniform distribution of the water through the coffee and the avoidance of channelling.

Either process may be followed by additional filtration (or clarification by centrifuge).

The brew is finally concentrated from, say, 4 per cent. strength to between 20 and 50 per cent. by evaporation under vacuum, at a temperature below 115° F. The points to be observed in this process are: the necessity for minimising the loss of the volatile flavouring constituents; the avoiding of

A Coffee Plantation in Kenya.

Picking Coffee.

(The above photographs are reproduced by courtesy of H.M. Eastern African Dependencies Information Bureau.)

oxidation of coffee butter, and the caramelisation of sugars.

One would imagine that it is not outside the bounds of possibility to devise a continuous process of manufacturing coffee extract. Another point is the possibility of replacing the loss of flavouring aromatics by the addition of synthetic products.

Finally, caramel is usually added, possibly followed by white sugar and glucose, in which case the mixture is stirred, boiled, and skimmed. Often an addition of glycerine is also made, after which the product is bottled and corked while hot (not less than 180° F.), and afterwards cooled.

For relatively small-scale work a somewhat simpler process may be adopted. For example, the freshly roasted and ground coffee, together with—possibly—a certain proportion of chicory, may be placed in a pan and gently simmered for about two hours. For a good quality 15 lb. of coffee and 13 gal. of water might be used; for cheaper grades about three times the amount of water could be employed. The pan must be kept covered and the loss of water noted and afterwards made up with boiling water. Now run into the percolator and percolate for, say, two hours. If a percolator is not available, the brew should be allowed to stand for 24 hours well covered up. Decant and filter till quite bright, after which the caramel, sugar, glucose, and glycerine are incorporated in the manner described above.

For the preparation of a cheap grade of extract the following proportions of ingredients might be used:

Coffee Drying.

Coffee (a mixture of suitable grades)	4 lb.
Water	10 gal.
Glycerine	3 lb.
White sugar	18 lb.
Glucose	18 lb.
Caramel	2½ lb.

For better qualities the proportion of coffee to water is increased, and the proportions of the other ingredients are reduced, or the glucose may be omitted altogether.

Essentially, the preparation of *Café au Lait* entails the incorporation of full cream condensed milk in the coffee extract. As an indication of the proportions used, one might add ½ gal. of condensed milk to an extract prepared from 9 lb. freshly roasted coffee (say, 6 lb. Mocha and 3 lb. Java), together with 2 lb. of chicory and 8 gal. of water. Suitable proportions of sugar, glucose, glycerine, and caramel may be used as indicated above.

Natives and Settler's Wife Washing Coffee in Kenya.

Determination and Physiological Effects of Aluminium

Abstracts of Papers read before The Society of Public Analysts, on June 1, 1932

Colorimetric Method of Determination.

A METHOD was outlined by L. H. Lampitt, D.Sc., F.I.C., and N. D. Sylvester, M.Sc., A.I.C., for the accurate determination of small amounts of aluminium in foodstuffs, in which the Aurin tricarboxylic acid lake is formed under standardised conditions, the red colour of the final solution being measured in the Lovibond tintometer.

Separation of aluminium from the "wet ash" of the foodstuff is effected by a preliminary precipitation with ammonia, the aluminium being obtained in alkaline solution. Other metals which are liable to be present have been proved not to interfere.

The actual determination is carried out on an aliquot portion containing 0·01 to 0·06 mg. of aluminium. Using 20 gm. of sample, as little as 0·2 part per million of aluminium can be determined. Some results were given which indicate that the aluminium content of foodstuffs is increased by only a few parts per million after cooking in aluminium utensils. For example, the aluminium content of milk was increased from 0·4 to 0·6 part per million after boiling in an aluminium saucepan, and to 2·5 parts per million after standing overnight. Apples before cooking contained 2 parts per million of aluminium, and after boiling in an aluminium vessel for 30 minutes with sugar and water they contained 14 parts.

Spectrographic Method.

The spectrographic method of determining small quantities of aluminium was described by P. L. Bilham, B.Sc., A.I.C. A method of concentrating the aluminium content of a biological material on to an electrode has been devised so that no possible loss occurs. The spectrum is then excited by a condensed spark discharge, modified to remove air-lines as much as possible, and a quartz spectrograph is employed to photograph the spectrum. The plate is developed under standard conditions and then compared with sets of standards on plates prepared under precisely similar conditions. The results show that aluminium is detectable down to 0·1 mg., and that the intensities of the lines at 3944 A and 3961·5 A can be used to judge the amount present up to 0·2 mg. The method is, of course, specific for aluminium and of a reasonable accuracy.

Physiological Effects of Aluminium.

J. H. Burn, M.A., M.D., gave a summary of the literature relating to this subject. The first extensive investigation of the physiological effects of aluminium salts was made in 1886 by Siem, working under Professor H. H. Meyer. Siem found that doses corresponding with 30 to 40 gr. of alumina for a man had no effect whatever when administered by mouth to cats daily for four weeks. When the aluminium salt was injected under the skin, the fatal dose varied from 0·25 to 0·30 grm. of alumina per kilogram. These results, indicating that aluminium has some toxicity when injected, but is harmless by mouth, have in substance been confirmed by many subsequent workers.

Siebert and Wells examined the pathological changes produced by injecting alum and aluminium chloride; they found that anæmia was manifested after nine or ten daily injections, a fall in the hæmoglobin percentage and in the red cell count being recorded. In the spleen, pigmentation, thrombosis, and fibrosis were observed.

The experiments of McCollum and his colleagues, and those of Myers and Mull, show conclusively that the addition of aluminium salts to the diet of young rats has no ill effect on growth, health, and reproduction, even when four successive generations are observed.

The experiments of Myers and Morrison, and of Underhill and Peterman, show that when aluminium compounds are given by mouth to dogs, only insignificant changes in the amounts of aluminium in different tissues are found; it follows that aluminium salts are not absorbed from the alimentary tract, except in traces.

As a result of a scare in the United States that the use of aluminium baking powders was dangerous to health, the Department of Agriculture instituted a board of inquiry. The report, published in 1914, describes experiments on twenty-six university students, carried out in three different universities, who were given amounts of alum varying from 0·2 gm. to 10 gm. daily for about six months. It was unanimously reported from the results of these experiments that the amounts of alum likely to be consumed as a result of alum in baking powder, esti-

(*Continued on page 219.*)

A Corner of the Butchers' Department.

The MANUFACTURE of

MEAT PASTES

THE BASIS of meat pastes is formed by veal and bacon. It is advisable to include also a certain proportion of corned beef, as pickled meat improves the colour of the product. Obviously, much of the meat trimmings from any other operations which might be carried out in the factory would be pressed into service.

The meat, *i.e.*, the veal and bacon together with a certain proportion of corned beef and scraps of meat from various packing processes, is cut up, placed in a steam-jacketed pan, and covered with water. Seasonings such as onions, garlic, spices, and salt are added, and the whole is cooked for a period of, say, two hours. The meat is then removed by means of a strainer (or, in some cases, the liquid stock may be drawn off) and any farinaceous matter that may be employed—*e.g.*, rice flour or biscuit meal—is added to the stock, which is re-boiled to form a pasty mass. This is next run out into a bowl and cooled, after which it is mixed in a mixing machine with the meat.

If a special paste such as chicken and ham is being prepared, a certain proportion of canned chicken or other meat is incorporated in the meat basis and cereal matter in the mixer.

The next step is to pass the contents of the mixer through a mincing machine, from which it is filled out into jars (these should be filled to the top). The jars are then capped and preserved (sterilised) in retorts at 240° F. for about 30 minutes in the case of the usual small sizes. Jars of ½ lb. size may require 75 minutes and those of 1 lb. size 90 minutes at 240° F. No artificial colouring matter is generally added to meat pastes.

Another method, which omits farinaceous matter, is illustrated in the preparation of potted beef. A recipe may call for the following ingredients:

Neck of beef
Beef suet
Anchovy paste
Ground allspice

The amount of suet used is about one-third of that of the beef. The proportions of anchovy paste and allspice are adjusted to give the flavour required. Bake the beef and suet. Then bone, and chop up in a chopping machine. Add the anchovy paste and allspice, and mix all well together. Put through a

mincing machine and allow to stand until quite cold. Fill into jars and cap, after which the jars are processed in a retort. If the latter is not available, the jars may be placed in a tank of water, which is gently brought to boiling point and allowed to simmer, ½ lb. jars being given 90 minutes and 1 lb. jars 120 minutes.

In the preparation of chicken and ham paste the following recipe may be used as a basis:

Veal
Ham
Chicken
Table salt
White pepper
Ground allspice

The proportion of ham may be about half that of the veal, and the amount of chicken between one-third and one-half of that of the ham. The seasonings are added according to taste. Much the same procedure is adopted as indicated above for potted beef.

Another recipe, for veal and ham paste, is as follows:

Veal
Fat ham
Table salt
Ground mace
Cayenne

Here the proportion of ham to veal is somewhat greater than in the previous recipe.

There are, of course, many other types of paste, but those given above will be sufficient to indicate the lines along which to experiment.

Another View of the Butchers' Department.

(This and the photograph on the opposite page were taken in the factory of Angus Watson and Co., Ltd., and are reproduced here with their permission.)

Meat Packing

In the next issue T. Crosbie Walsh, F.I.C., F.C.S., will contribute an exhaustive discussion of Meat Packing and its Scientific Control, embodying the results of many years' experience in Argentina, New Zealand, and other parts of the world.

Metal Tubes for Foodstuffs

WHY IS it that more foodstuffs are not packed in collapsible metal tubes in this country? In Germany meat and fish pastes are frequently sold in this form, and in America also the metal tube has extended its sphere of usefulness far beyond the commonplaces of tooth-paste and shaving cream.

Consider the case of prepared mustards, for example. The metal tube is handy, economical in use, and convenient to pack. Further, the last squeeze can be used, whereas even the most frenzied attack leaves much waste product in the porcelain pots generally employed at present. Certainly one would not suggest metal tubes for the restaurant trade, but they have distinct and definite advantages for the individual consumer.

Metal tubes are usually made of tin sheet, which can be procured of a standard purity varying only about a half of one per cent. Laminated metals, lead and aluminium, are also used; of course, tubes containing a considerable quantity of lead cannot be used for foodstuffs, although valuable for certain kinds of soaps and oils. Metal tubes are strong, air proof, and moisture proof.

Aluminium foil, often used for metal tubes, is indeed a great asset to the packaging, production, and publicity managers. It takes print well, and bold colouring stands out well against its polished background. Tubes have been printed successfully in four or more colours, and the design on the tube can be linked up successfully with the press advertising of the firm. The non-toxic qualities of aluminium make it particularly suitable for food products, and its ductility is a further advantage, as the tubes can be rolled up from the base as the contents are exhausted.

A point of interest to the small producer is that the filling and sealing machinery is comparatively inexpensive, suitable for short runs, and less complicated than many other types of packing machinery.

The public are already familiar with metal tubes for a variety of purposes, so that the innovation of using them for foodstuffs would not be very startling. Their ease in packing, comparative immunity from breakage in transit, low cost, and decorative complacency should make them extremely suitable as containers. It is curious that manufacturers in this country have not as yet seriously considered them in relation to food packing.

L. F. E.

A New Filter

IT appears that a new type of filter with interstices covered with silver has been tested at the Pasteur Institute by Dr. Nicholas Metalnikov. The investigation showed that the power to destroy living bacteria was conferred upon the filtered water. The filter is made by adding silver chloride to the moulding clay and baking at 2,200° F. This filter was invented by Georges Lakovsky, who states that the water which passes through does not contain any silver and is perfectly harmless, and yet it retains for several days the power to destroy resistant bacteria such as *B. coli* and *B. typhosus*.

It is difficult to find a suitable explanation for this action that is totally different from other filters, which merely remove the bacteria by filtration or kill them by contact. The bestowal of bactericidal properties on water without any added antiseptic is a new idea, and the inventors claim that the action is entirely due to the ionisation of the water and it disappears if the water is boiled for a few minutes. During its passage through the filter the water becomes slightly alkaline, due, no doubt, to soluble matter derived from the clay.

Peaceful Food Factories

THE Ministry of Labour Gazette gives details of the number of disputes in industry involving stoppages of work in Great Britain and Northern Ireland in 1931. Altogether there were 420 strikes which involved 491,800 people compared with 308,700 in 1930. The total time lost was 6,983,000 working days. The contented state of the food industries is indicated by the fact that in the food, drink, and tobacco trades there was only one stoppage of work which involved about 5,000 female herring curers at Great Yarmouth. The issue at stake was a minor one—a proposed reduction in "subsistence money" below the rate paid in the previous season—and a modification was made and work was resumed within two days.

The Oyster

Two recent bulletins of the U.S. Bureau of Fisheries deal with oysters. One, by Hopkins, is entitled "Sensory Stimulation of the Oyster, *Ostrea Virginica*, by Chemicals," and the other, by Hopkins, Galtsoff, and McMillin, deals with the effects of pulp mill pollution on oysters. A third bulletin, by Federighi, is a comprehensive account of the common oyster drill, whose economic importance is due to the fact that it destroys a great many oysters. In Long Island Sound and in New Jersey this loss amounts annually to over a million dollars. In England, the occurrence of the "American oyster pest" on oyster beds was discussed by Orton and Winckworth in *Nature* (1928, p. 241). The oyster drill can be greatly reduced in numbers provided the oyster planter is willing to make a little effort; it is practically non-migratory.

BRITISH MACARONI?

A SUGGESTION

To the Editor.

DEAR SIR,

I have read with great interest the article appearing in the May issue of FOOD MANUFACTURE on the manufacture of macaroni.

In trying to get macaroni manufacturers interested in Soyolk some time ago, we found to our disappointment that no macaroni, spaghetti, noodles, etc., were manufactured in this country, which seems a great pity, as there appears no obvious reason why a British manufactured product, put up in attractive packets or cartons, should not meet with great success.

At the time of my last visit to New York, the incorporation of Soyolk in macaroni was in its infancy, but I am glad to say that since then several manufacturers have gone ahead with the production of an extremely attractive grade in which 18 per cent. of Soyolk is incorporated. From a purely starch product this commodity has now been converted into a well balanced food, and is now consumed by a number of people who had hitherto been unable to eat macaroni on account of the subsequent development of hyperacidity and its attendant discomforts which it is known in some cases to bring about.

I think quite a number of concerns would be interested to consider the installation of a macaroni plant in this country to provide the public with a good quality British product to compete with the huge foreign imports which are now consumed.

Yours faithfully,
J. C. FERRÉE.

MARZIPAN MANUFACTURE

To the Editor.

DEAR SIR,

Your readers will no doubt be grateful to "Praxis" for his letter on Marzipan Manufacture, but surely there is either a typist's or printer's error in the last line, making it read "all foodstuffs are better when they are fresh." One can hardly imagine an epicure sitting down to a meal where jugged hare had been prepared from fresh hare, or where pigeon soup or pie had been made from fresh pigeon. Vinegar and chutneys are always improved by a certain amount of storage. It is unusual to eat cheese before it has matured, though it is possible that in some of the maggoty varieties the freshness of the maggots is rather important. Mincemeat, Christmas puddings, and rich fruit cakes improve on keeping, and one hesitates to think of the consequences of entertaining one's friends to new wines, freshly distilled whisky or brandy, and offering them a perfectly new liqueur with their coffee.

Yours faithfully,
THOMAS MCLACHLAN.

The New York State Agricultural Experiment Station

Some Recent Investigations

A CONSIDERABLE amount of work has been devoted to various questions relating to milk. Important early contributions were "Filtration and Clarification of Milk" (*Tech. Bulletin*, No. 104, July, 1924), and "The Creaming of Raw and Pasteurised Milk" (*T. B.*, 157, October, 1929); in 1931 there appeared "The Utilisation of Dry Skim Milk in the Manufacture of Ice-Cream and Cream Cheese" (*T. B.*, 174, March), "The Creaming of Milk Pasteurised at High Temperatures" (*T. B.*, 180, July); "Pasteurising and Cooling Milk in the Vat to secure Maximum Creaming" (*T. B.*, 189, February, 1932), "Sampling Milk for Fat Test at Milk Plants" (*Bulletin* 605, February, 1932), and "Thermophilic Bacteria in Milk Pasteurised by the Holder Process" (*T. B.*, 191, March, 1932). The investigators were A. C. Dahlberg, J. C. Marquardt, H. L. Durham, and R. S. Breed.

Four other reports of special interest are "The Rate of Chemical Change in Milk brought about by Certain Lactic Acid Streptococci" (*Bulletin* 184, October, 1931, by C. D. Kelly), "Correlation Studies of the Growth of Apple and Cherry Trees in the Nursery from the Seedling to the Two-Year Budded Tree" (*T. B.*, 185, October, 1931, by H. B. Turkey and K. D. Brase), "Virus Diseases of Black Raspberries" (*T. B.*, 175, March, 1931, by W. H. Rankin), and "Spraying and Dusting Experiments with Potatoes on Long Island" (*T. B.*, 592, February, 1931, by H. C. Huckett).

Pasteurisation and Creaming.

In *Technical Bulletin* 180, cited above, Marquardt and Dahlberg investigated the relationship of high temperatures of pasteurisation to the time that milk can be held hot before its creaming properties are impaired. They show that reduction in cream layer volumes from excessive heat was caused by failure of the fat to rise into the cream layer. The fat content of the cream decreased with increased temperatures or time of pasteurisation.

It is emphasised in the discussion that internal tubular high temperature heaters should be built in at least two units. This is true of present experimental heaters in milk plants. The first unit should pre-heat milk to about 142° and the differential between heating water and the final temperatures of milk may be low. This study indicates that the heating in the second unit should be rapid to reduce to a minimum the period of time required to attain the final temperature.

Rapid heating in fewer tubes with hotter water should increase the holding period because the heat induction period is held at a maximum and the lag period in flowing through the tubes is reduced. The temperature and rate of flow of milk into the second unit must be constant to secure uniformity in the effect of pasteurisation at high temperatures on cream layer volumes.

Shredded Suet

THE Committee of Public Analysts suggests that, pending the establishment of any legally authorised standard, shredded suet should contain not less than 83 per cent. of fat. A lower percentage of fat should be regarded as indicative of excess of flour. This fat standard is sufficiently low to cover any reasonable variation due to uneven distribution of flour. The nature of any admixture to suet should be declared.

TRADE NOTES

Columbian Salmon Grading.

On June 1 there came into force an Order in Council subjecting British Columbia canned salmon to a rigid system of Government inspection prior to marketing. The Inspection Board, which has just been appointed, consists of three members—Mr. Herbert Miskin, Mr. W. Page Powell, and Mr. E. O. Cornish, all of Vancouver. Regulations governing the inspection of canned salmon call for a minimum of twelve cases to be withdrawn from parcels of up to 100 cases, with a sliding scale of withdrawals for larger parcels. One or more cans from each case thus withdrawn will be opened for inspection.

Parcels approved as being fresh, firm, and well packed will receive the Department of Fisheries certificate, which signifies that the goods are of first quality. Parcels which do not come up to the exact standard of this requirement, but which are sound, wholesome, and fit for human food, will be labelled "second quality," but will receive no certificate. Canned salmon which does not come up to second quality will not be sold for human consumption.

* * *

National Mark Booklet.

The Ministry of Agriculture and Fisheries has just issued a third edition of the National Mark booklet, which contains a brief outline of the objects and scope of the National Mark scheme for the better standardisation and marketing of home agricultural and horticultural produce, together with a statement of its advantages to producer, distributor, and consumer. The booklet also gives a short description of the scheme in its special application to the following home-produced commodities which, according to season, are sold under the National Mark: Apples, pears, tomatoes, cucumbers, strawberries, cherries, canned fruits and vegetables, cider, eggs, dressed poultry, all-English wheat flour, malt products, and beef (the last in London, Birmingham, Leeds, Bradford, and Halifax only). English honey, plums, and bottled fruits and vegetables will be available under the National Mark guarantee of origin and quality for the first time in 1932.

Copies of the booklet may be obtained, free of charge, on application to the Secretary, Ministry of Agriculture and Fisheries, 10, Whitehall Place, London, S.W. 1.

* * *

The Canners' Exhibition.

Sales of space for trade exhibits at this year's Fruit Show and Canners' Exhibition are already in excess of last year's total, which was a record at that date. Stands have been taken by leading firms in practically every section of the two industries, including insecticide manufacturers, horticultural machinery and sundries manufacturers, box makers, canners, and canning machinery manufacturers.

Features of the Birmingham show will include conferences for fruit growers and canners and a retail fruit shop for the disposal of a proportion of growers' entries to visitors, which is being organised by the Birmingham Retail Fruiterers' Association.

Discussions are also taking place with Dominion officials in London and representatives of English growers regarding ways and means of providing free samples for visitors to the show, in view of the withdrawal of the Empire Marketing Board grant for this purpose. Considerable progress has been made on the basis of a proportion of the cost being borne out of the show funds, and the balance by organisations representing English and Dominion growers.

An important concession has been granted by the railway companies in connection with travelling facilities to and from Birmingham during the show period. From stations within 60 miles of Birmingham return tickets will be issued at single fare for the double journey. From stations outside the 60-mile radius return tickets will be issued at fare and a third for the double journey from all parts of the country, available from the day before the opening to the day after the closing of the show. Such tickets will be issued in exchange for a voucher signed by the secretary.

* * *

Industrial Education Conference.

The Association for Education in Industry and Commerce held its Fourteenth Annual Conference in London, at the Leathersellers' Hall, last month.

Mr. R. W. Ferguson (Director of Education, Messrs. Cadbury, Bournville, and Chairman of Council of the Association) spoke on "Education in Industry." Messrs. Cadbury were one of the first firms to organise educational schemes for their employees, and they now have a comprehensive continuation system of education which covers both junior and senior employees. Mr. R. A. Rendall (British Broadcasting Corporation) also spoke on "Adult Education in Relation to Industry."

A visit was paid to one of the depôts of United Dairies, Ltd., who are staunch supporters of the Association and have a flourishing Education and Welfare Department.

* * *

From the middle of last month the Visco Engineering Co., Ltd., the well-known manufacturers of air-conditioning plant, water-cooling plant, etc., removed to their new works at Stafford Road, Croydon (Surrey), to where all communications should now be addressed.

* * *

Malt Extract and the Modern Bakery.

Experience has shown that malt extracts are a valuable adjunct to baking, both in large and small bakeries. Their use helps to ensure a better quality product and a greater yield from the flour. From the chemical point of view the powerful effect of malt extract is due, on the one hand, to the fact that the nutrients it contains are a better food for the yeast and therefore bring about a better fermentation; on the other hand, to its high diastatic power, which strongly promotes the dextrinisation of the flour and conversion into sugar. Use is also made of other malt products (malted flours, etc.). Malted flours of commerce, however, often require a long time before they promote fermentation on account of their "unhydrolysed" condition.

In "Dry Isomalt" it is claimed that bakers are given a dry malt extract, suitable for all kinds of bakeries, by an original process which avoids the expensive and troublesome extraction process. Chemical tests and practical trials are said to have shown that this strongly hydrolysed malt product, which has the same diastase content as malt extract, brings about a quicker fermentation than the latter and results in a well-baked product. Further, the dry product, on account of its powder form, is much more easily handled. The required quantity can be neatly obtained either by weight or volume. A fermentation cupboard is also not absolutely necessary, as the new product is reliable in its action.

* * *

I.F.S. Canning.

With reference to a recent paragraph on Irish canning, Messrs. J. Matterson and Sons, Ltd., of Limerick, inform us that they were the first to set up a cannery in what is now known as the Free State, and possess samples of meats which they canned fifty years ago and also of "iron rations" which the firm produced at the time of the Boer War. Messrs. Matterson's present cannery is equipped with completely modern plant, working on meat, pastes, vegetables, and sausages, with a capacity of 10,000 cans per day.

The committee which is endeavouring to obtain the greater use of home produce by hotels and caterers met the National Mark Canned Fruit Committee and representatives of individual canners in London last month. After the meeting a communique was issued by the Ministry of Agriculture and Fisheries as follows: "It was already known that large quantities of canned English fruits and vegetables (mainly peas) were purchased by the catering trade. The purpose of the meeting was to consider the special requirements of hotels and restaurants, not only as regards particular fruits and vegetables that are still mainly obtained from abroad, but also in connection with such matters as sizes of can, size grading and quality grading, and strength of syrup. The discussion at the meeting should be of material assistance to the industry in its efforts to supply the type of goods required by this special class of consumer.

"Generally speaking, the quality of English fruits in syrup gives satisfaction. A questionnaire completed by a number of the principal hotel groups and catering firms indicated that their supplies of canned plums, damsons, greengages, raspberries, and red currants are obtained exclusively from home sources, and a high proportion of their black currants, cherries, and strawberries. Apart from peas, the canning of vegetables in this country is not yet so highly developed as in the case of fruits. Considerable progress is being made, however, and there is no reason why the popularity achieved by canned fresh-picked peas should not be repeated in the case of beans, carrots, celery, new potatoes, turnips, spinach, and asparagus. On the technical side the industry is receiving valuable assistance from the Chipping Campden Research Station, one of whose notable successes has been the discovery of a harmless colouring matter for peas, enabling English canners to produce an article unrivalled elsewhere."

* * *

Control Instruments for Food Industries.

The large scale on which manufacturing processes are now carried on in the food industries has placed a premium on accurate control of manufacturing conditions. At one time the quantity of material handled at a time was so small that even if mistakes were made in estimating temperatures, pressures, or humidities, and a batch was spoiled, the quantity of material lost was not desperately large, and total outputs were usually sufficiently small to be adequately supervised by one or two experienced men. To-day, however, total outputs and batches are so much larger and profit margins so much smaller that such risks are no longer permissible, and outputs of foodstuffs are required to form very closely to the standard.

It is hard to say whether increased outputs have developed control instruments or control instruments the increased outputs—probably a combination of both is nearest the truth—but a very well-produced booklet received from the Cambridge Scientific Instrument Co., Ltd., gives some illuminating details of the extent of the application of physical instruments to industry. The more important industries—baking, canning, brewing, confectionery, and dairying—are dealt with individually, with illustrations of installations of the instruments normally employed in them. Some of the less common and minor uses are described separately, and finally comes a description of the principal instruments themselves, the whole occupying about thirty quarto pages. The booklet contains a large amount of really valuable information and is worth being read by everyone engaged in food manufacture. However conversant with scientific control the reader may be, we think he will be sure to find in it several applications new to him.

* * *

A Container Sealing Machine.

Many users of the fibreboard and cardboard containers now so popular among food manufacturers retain the hand-glueing method of sealing the closing flaps of the containers. The chief objections to this method—slowness and uncertainty—are, it is claimed, completely avoided by a simple machine which Messrs. Jagenberg, Ltd., have produced to do the same duty. The machine applies the adhesive to one of the two large flaps by means of a rotary roller, and at the same time the container is led along and the small dust flaps are turned in by hand.

As these three operations are performed simultaneously, the new method results in a higher working speed. The thin and even application of the adhesive to both sides of the closing flap ensures a hygienic and tight pack—as near air-tight as possible.

But these are not the only functions of the machine; it possesses a brush-lined channel at right angles to the glueing passage, into which the sealed container is simply pushed and left alone, the pressure brushes looking after secure sealing of the flaps. The channel is of suitable length to accommodate a number of containers, and the container which has been in the longest emerges at the other end, when the operator pushes the newcomer at the machine end of the channel.

The space occupied by one machine is 16 inches by 20 inches. The machine is portable, has a wide range of adjustment, and can be carried to the material.

* * *

South African Pineapple Canning.

The pineapple canning activities in the Union of South Africa are very largely controlled by one packing company, according to the Assistant Trade Commissioner at Johannesburg. This plant is located at Port Elizabeth, in the eastern section of the Cape Colony, in the very centre of the pineapple growing districts. There are, of course, a few small competing canning companies, but it is understood that none of these latter have the equipment or organisation to handle large quantities and turn out first-class products.

The adverse trading conditions of 1931 and 1932 were clearly indicated in South Africa beforehand, and the local industry, as a precautionary measure, restricted its pack and adopted a policy of controlling output as the only safe course until the world's purchasing power has returned to normal. It was decided that increased activity and larger supplies, for the purpose of reducing the overhead ratio so that lower prices might be quoted, was a dangerous practice, and, consequently, the outlook for the 1932 season presumes the packing of only such quantities as can be sold, at a profit, in orderly fashion.

There are no accurate figures available which might be used to calculate the areas planted to pineapples. However, one authority has estimated that in the Bathurst district there are about 40,000,000 plants in the ground. These planting areas are by no means consistent and steady, because many growers have failed to realise profits which were expected, and the consensus of opinion is that the whole planted ground for 1932 is considerably less than was the case in 1929.

Something like 80 per cent. of the Bathurst district's production will be canned, while the remaining 20 per cent., in conjuction with pineapples grown in Natal, will either be sold on the local market or shipped fresh overseas. Neither of these latter outlets hold much promise, however, as the exchange difficulties, in so far as exports are concerned, render the probability of net profit very slender.

Sales of fresh fruit on the Union markets have, in most cases, been profitless, as in many instances the cost of freight has not been covered in the return.

It is estimated that something like 60 per cent. of the total pineapples canned during the season go into export trade, the remaining 40 per cent. being consumed locally. During 1930 the total exports amounted to 1,330,254 pounds, so the entire canning production during that year probably amounted to 2,217,090 pounds. The greater share of these exports go to Canada and Great Britain, although it is understood that the consummation of the Australia-Canadian trade treaty has had a most adverse effect upon the business with Canada. The depreciation of sterling also had a discounting effect upon the results coming from efforts in the British market, at least for the time being, for the recently inaugurated "Buy British" campaign has, it is reported, given trade with England a most decided stimulus.

INFORMATION and ADVICE

ON CUSTARD POWDER—FISH PASTES—RANCIDITY—LECITHIN IN RUBBER—MALT EXTRACT—PEPPERMINT TABLETS—ACTIVE CARBON—DETERMINATION OF ACETIC ACID IN PICKLES

Custard Powder.

708. *We should be glad to have some particulars of the process used in making custard powder. Would an improvement be effected by putting the cornflour through a drying process?* (Ireland.)

The main object is to obtain an absolutely thorough and even mixing of the colour and flavour with the cornflour or whatever particular type of flour or mixture of flours that may be used. This may be done in either of two ways. A certain portion—say, one-tenth—of the batch of flour may be thoroughly machine-mixed or ground with the colour and flavour, and afterwards dried, milled, and sieved. This base is then thoroughly mixed with the rest of the batch, which has previously been brought to the correct degree of dryness.

Another method is to spread out the whole of the cornflour on a table and sprinkle over it the colour and flavour, mixing well by hand. (There appears to be no reason why this should not be done by the aid of a mixing machine and spray of the Gardner type.) The material is then placed in paper bags of about 25 lb. each and stacked open on shelves in the drying-room for six to eight days (not more than ten) at a temperature of 110° to 115° F. The paper bags are stripped off after this period and the material broken up into lumps and spread out on wooden trays, which are stacked in the drying-room at 110° to 115° F. for about a week, after which it is passed through steel rolls and a fine sieve. In this second process there appears to be no advantage in drying the cornflour first—in fact, it would be a disadvantage.

709. *Please inform me what machinery is needed to make marzipan suitable for bakers and confectioners, and give formulas for the same.* (Lancashire.)

Details were given in the January and June issues of this year.

710. *You seem to have a fund of information, and we wonder if you can tell us where we can obtain a hand machine for cutting mint to make mint sauce in bulk. Also, do you know the makers of a hand machine for crushing plum stones without damaging the kernels.* (England.)

Suggestions were made.

711. *Kindly supply us with the names of firms making onion-peeling machines and also machines for forming curly rolls and scrolls from butter.* (London.)

These were given.

712. *We should be glad if you can give us any information with regard to the method employed in canning grape-fruit.* (Wales.)

Particulars are given on page 113 of the new edition of the *Food Industries Manual*.

713. *Can you give me a recipe for making a good potted beef?* (Leicester.)

See the article on another page of the present issue.

714. *I am anxious to know whether there is a machine for stamping the lacquered lids of fruit cans with ink.* (London.)

Suggestions were made.

Fish Pastes.

715. *Kindly give us recipes for sardine paste, shrimp paste, and bloater paste.* (Birmingham.)

A general account of the preparation of fish pastes was given in last month's issue. Reference should be made to this for the methods employed.

For genuine sardine paste one might use the following:

Sardines	Table salt
Butter	Ham fat
Boiled veal	White pepper

The amount of butter might be about one-fifth of that of the sardines, and the veal about one-tenth or perhaps a little more. The amount of ham fat used need only be about a quarter of the weight of veal. The seasonings are incorporated in amounts to suit the special requirements of flavour, etc. The veal and the ham fat should be chopped and mixed well together.

In the preparation of shrimp paste (which was referred to in the last issue) one might use shrimps (skinned), tinned lobster, anchovies (boned), fat, salt, white pepper, cayenne, mace, and rice flour.

There are, of course, numerous variations of recipes for bloater paste. Some contain red herrings and fat; in others bloaters, salmon, anchovies, fat, butter, rice flour, and flavouring material such as ground black pepper and nutmeg may be used.

716. *How and where does one register the name of a food? I want to find a manufacturer who will manufacture "rock" for me with a special name printed into it.* (Cambridgeshire.)

The enquirer was referred to suitable firms.

717. *I notice in your issue for June, 1932, that you have furnished information regarding manufacturers of sodium glutamate. I would be glad if you could give me the name of an English manufacturer.* (London.)

This was done.

718. *Can you put us in touch with firms manufacturing plant for grinding and dressing whole tapioca roots?* (Lancashire.)

Names of firms were supplied.

Rancidity.

719. *It is often stated that beeswax which has been purified and bleached is liable to go rancid, whereas the unbleached product is not so affected. Does this statement hold true of purified beeswax which has been dissolved in paraffin and is free from any other substance likely to develop rancidity?*

Is it possible to purify cocoa-butter in such a way as to remove its smell? If so, would such a purified product be liable to become rancid? (London.)

It is, of course, well known that refining and bleaching often reduce the resistance to rancidity possessed by crude vegetable oils, owing probably to removal or destruction of traces of natural anti-oxidants originally present.

The composition of beeswax varies rather widely with the source, but the iodine value is usually sufficiently low to

suggest that the material should be fairly resistant to oxidation rancidity. Nevertheless, bleaching by air (and light) by organic peroxides, or by other chemical agents, might be expected to increase the tendency to rancidity. It should be a simple matter to make an actual test under the particular conditions the enquirer has in mind.

As regards cocoa-butter, Messrs. Geo. Scott and Sons (London), Ltd., have developed a solvent extraction plant, primarily for extracting the fat from waste cocoa powder. The solution of fat in the solvent is drawn off into a patent continuous vacuum still, where the solvent is driven off by steam and recovered. The fat is separated from the water and is then deodorised in a refining plant under high vacuum. This deodorised cacao-butter is much improved as regards its tendency to develop rancidity.

The whole subject of the development of rancidity in fats will be treated in a future issue.

720. *Could you kindly give us the names and addresses of some English canners of vegetables (peas in particular), jams, fruit, etc., who might be able to supply us with these commodities which we require for marketing under our own brands? We should prefer to know packers who mostly sell through brokers.* (Birmingham.)

Suggestions were made.

721. *Can you give us particulars of a process for canning crab and lobster?* (Scotland.)

This will be fully treated in the special canning issue in October.

722. *We have had an enquiry for lead-lined copper cylinders to evaporate moisture by steam heat from certain materials. Could you refer us to likely manufacturers?* (Liverpool.)

This was done.

723. *We have noticed that there has appeared at regular intervals in your magazine an advertisement by a manufacturer of wooden kegs. Would you be good enough to furnish us with the name and address of this, and any other manufacturer of wooden kegs or drums suitable for the packing of bulk powders.* (New Zealand.)

Names were supplied.

724. *I should be very thankful if you could let me know whether, for preserved or canned fruits artificially coloured, it is necessary that the containers should bear a label showing that the produce has been coloured.* (France.)

So long as permitted colours are used there is no necessity to declare this on the label of products made and sold in this country.

725. *Kindly let me have particulars of the manufacture of baking powders.*

This will be dealt with in the September confectionery issue.

726. *Kindly supply us with the names of makers of sterilising plant for preserves in glass jars with rubber-jointed tin caps.* (Liverpool.)

This was done.

Lecithin.

727. *We have seen in the "Revue des Produits Chimiques" that "lipine" can be obtained from raw rubber, and that this product is very much like lecithin which is found in eggs. As the dry yolks have been recently placed under quota, we should be greatly obliged if you would tell us whether it is used in England in the textile industry for dyeing and weaving purposes to replace the lecithin and also by bakers and biscuit manufacturers to replace dry yolks.*

We should be interested to hear from you about this matter. (France.)

We did not know previously that lipins (or lipoids as they are sometimes called) were present in either latex or raw rubber. We knew, of course, that latex contains about 1½ per cent. proteins, but lipins are chemical bodies of quite a different character.

Lipins are a group of chemical bodies of very complex composition and resemble the fats in that they are soluble in ether and alcohol. They are present in the protoplasm of all cells.

The two chief members of the group are cholesterol and lecithin. The latter belongs to a sub-group of the lipins called phosphatides, and contains both phosphorus and nitrogen.

Lecithin has in the last few years assumed a position of importance in the food industry, as it possesses valuable emulsifying properties. It is mainly obtained from the soya bean, but another source of supply is egg yolk.

As far as our knowledge goes we do not see how one could obtain any product of a commercial value from raw rubber which would have the same properties and uses as lecithin.

However, we cannot, of course, speak with any certainty on this point as we do not know if raw rubber contains any lipin closely resembling lecithin, and, in the second place, whether this can be commercially extracted from raw rubber if it is present, and, in the third place, whether it could be used in a manner similar to that of lecithin.

We notice that one of the new uses for rubber suggested in the bulletin of the Rubber Growers' Association is to use latex or rubber dispersions as a constituent of the sizes used for calico printing, dyeing, and stiffening, especially as regards retention of stiffening ingredients and fillers.

Fat from Bacon and Hams.

728. *We make a small quantity regularly of refined ham fat. Can you oblige us with the names and addresses of firms who would be likely to buy?* (London.)

Waste fats from bacon and hams are, as a general rule, sent to soap makers, who extract the fat and make it into soap and turn the residue into either chicken food or manure. Though these fats were formerly used for edible purposes, they are now so cheap that they are mostly used for technical purposes.

The enquirer was referred to possibly interested firms.

729. *Kindly send us the names of sellers of lard stearine.* (Wales.)

Names suggested.

730. *Will you be good enough to give us a recipe for the manufacture of free-running table salt?* (Ireland.)

We have dealt with this on several previous occasions. Tri-basic calcium phosphate is frequently used. One authority says magnesium phosphate is also used. In America it is common practice to mix the salt with rice flour, but we do not know if this is done over here.

731. *Please supply names of makers of laboratory size dough mixers for test purposes.* (Scotland.)

This was done.

732. *We shall be glad if you will favour us with recipes for potted meats, pickles, piccalilli, and thick sauce.* (Norway.)

Potted meats are dealt with in the present issue. An article on piccalilli manufacture was published in the June, 1932, issue. The preparation of sauces will shortly be discussed in detail.

733. *Kindly give us recipes and instructions for making coffee and chicory extract, sauces, and lemonade crystals.* (Ireland.)

Coffee extracts are dealt with in the present issue. In the last issue, page 186, we gave a recipe for lemonade crystals. Sauces are to be treated in a future issue. The "Drydex" of A. Boake, Roberts and Co., Ltd., might be used in this connection.

734. *We require the name of a firm (preferably English) making a machine for peeling pickling onions.* (Staffs.)

Names were supplied.

735. *As a subscriber of some years' standing to* FOOD MANUFACTURE, *I should like to know the names of any publications on retort work for pastes and canning.* (Liverpool.)

The most complete and up-to-date account appears in the last edition of the *Food Industries Manual*. Fish pastes were dealt with in the last issue of this journal, while an account of processing meat pastes appears on another page of the present issue.

736. *In your issue of August last a description was given of the modern production of Swiss roll. Can you give me the names of the firms who manufacture the various machines?* (Hull.)

This was done.

737. *Which is the more suitable, gun metal or stainless steel, for filling machines for cream?* (Cornwall.)

We should certainly say stainless steel. Gun metal contains a high percentage of copper.

Invertase.

738. *Can you give us any information on the uses and manufacture of invertase?* (London.)

Possibly you refer to the invertase preparation used in connection with fondant centres for chocolates. The application of invertase for this purpose was worked out by Mr. Paine, of the Carbohydrate Laboratory of the United States Bureau of Chemistry. A patent was taken out which was assigned to the United States public. The manufacture has been taken up by the Nulomoline Co. of America (London agents, Fredk. Boehm, Ltd.).

The Nulomoline Co. state the following: "The Booker process, which is owned by us, covers broadly any and all uses of the yeast enzyme, invertase, in the manufacture of soft cream centres. It is covered by Letters Patent in the United States, Canada, and other foreign countries. It is our policy to grant licences to use the patented Booker process to those purchasing from us invertase manufactured by the Wallerstein Laboratories and marketed by us under the name of Convertit."

739. *Kindly oblige me with the names of two leading books on the distribution and production problems of milk and dairy products in cities and the manufacture and marketing of bacon.* (Poznán.)

These were supplied.

740. *Please supply names of makers of palm kernel oils, both ordinary and deodorised.* (Middx.)

These were given.

Active Carbon.

741. *In Robert Whymper's book, "Norit" is recommended as a sugar decoloriser. What is this, and where can it be obtained?* (Yorks.)

This is the trade name of a brand of adsorptive active carbon. It is manufactured from certain vegetable material and "activated by means of gases." Both "Norit" and "Carboraffin" are used for decolorising and purifying refined intermediates, end products, and the juices themselves in the sugar industry. The two methods of application are the "mixing-in" process and the method of "layer filtration." In the former process the carbon is fed into the clarifier and kept in contact with the sugar solution at a temperature of about 80° to 90° C. for about fifteen to twenty minutes. The carbon is then filtered off.

742. *Kindly let us have addresses of suppliers of tomato seeds for use with tomato purée.* (Wales.)

Suggestions were made.

Acetic Acid in Pickles.

743. *Can you tell us what is the simplest way to test the strength of acetic acid in pickles?* (Glasgow.)

The usual way of doing this is to use an ordinary titration method with standard alkali.

Thus one may take 10 c.c. of the pickle liquor, dilute with water—filtering if necessary—and titrate with deci-normal caustic soda, using phenolphthalein as an indicator.

Malt Extract.

744. *What causes malt extract to crystallise? What are the latest and most efficient types of plant used in the manufacture of malt extract?* (Glasgow.)

Maltose sometimes crystallises out from malt extract after standing some time. In general terms this is caused by various factors during the process of manufacture. Thus temperature is one factor; also the proportion of maltose to dextrin and dextrose, and the distribution of nitrogen and protein are others.

As regards correcting this defect, this is a job for a specialist. For plant, see p. 230, August, 1931, issue.

Peppermint Tablets.

745. *Kindly give us your opinion of the ingredients used in making peppermint tablets (samples submitted).* (London.)

Most probably the ingredients are icing sugar, mucilage of acacia, and oil of peppermint, with probably a trace of aniline royal blue. The amount of peppermint is adjusted to the strength required. The same remark applies to the proportion of gum to sugar; for example, it may be 1 : 10 parts by weight. The sugar is placed in a mixing machine and the gum, flavour, and colour poured into a central depression made in the sugar. Mixing is carried out to give a workable and uniform consistency. The amount of gum used is best determined by experiment.

Another method is to place on a slab a large portion of the sugar. Make a depression in the middle of the heap and pour into this the mucilage of acacia and the peppermint oil. Work into a stiff paste, adding more sugar or mucilage as required. Roll portions out as one does pastry to a determined thickness and cut lozenges with a punch. Dry the lozenges on trays until quite hard.

The exact proportion of peppermint is to be determined by trial. There is, of course, plenty of scope in the selection of the oil so as to obtain a good mellow flavour. The better quality oils are well worth the extra cost, particularly in this case.

The above is a hand process. This type of lozenge can be made quite well in a tablet compressing machine, in which case powdered gum acacia is mixed with the sugar, the oil rubbed in, and the mixture granulated in the usual way. A strong compression should be used so as to get a really hard tablet which will dissolve slowly and not break up in the mouth. A good proportion of gum must also be used to help in producing this result.

Orchard Insect Pests

MUCH useful information regarding insecticides, equipment, and methods for controlling orchard insect pests is given in *Farmers' Bulletin*, No. 1666, by Quaintance and Siegler, published in September, 1931, by the U.S. Department of Agriculture.

The bulletin describes the insecticides and treatments that are at present giving the best results against the more important insect pests of the orchard, and tells at what season these treatments may be most effectively applied. Various types of dusting and spraying apparatus, nozzles, etc., are described and illustrated. Moreover, the more common fruit pests and the nature of the damage they do are discussed, and for each the proper control measures are given.

New Companies

CONSTANTINO, GANCIA, AND RICASOLI, LIMITED. (265636.) 3, Lawrence Pountney Hill, E.C. 4. To carry on the bus. of mnfrs., bottlers, and shippers of wines, etc. Nom. Cap.: £600 in £1 shares.

T. G. AND W. A. MILLER, LIMITED. (265657.) To take over the bus. cd. on at Latham Works, Latham St., Bulwell, Notts, as the "Assam and Ceylon Tea Company." Nom. Cap. £5,000 in £1 shares.

INVICTA TOFFEE COMPANY, LIMITED. (265642.) St. Peter's Hall, Bridge Street, Greenwich, S.E. To carry on the bus. of confectionery mnfrs., etc. Nom. Cap.: £300 in £1 shares.

CARLTON BAKERIES, LIMITED. (265633.) 114, King Street, Hammersmith. To carry on the bus. of bakers, etc. Nom. Cap.: £500 in £1 shares (250 founders' and 250 ord.).

ETHEL WARD, LIMITED. (265476.) To take over the bus. cd. on at Corbridge, Northumberland, as "E. E. C. Ward," and to carry on the bus. of fruit and vegetable growers, etc. Nom. Cap.: £2,000 in £1 shares.

R. ROBSON AND SON, LIMITED. (265495.) To take over the bus. of fish curers cd. on at 29, Daltry St., Hull, as "R. Robson and Son." Nom. Cap.: £500 in £1 shares.

MARK MARKS AND COMPANY, LIMITED. (265815.) To take over the bus. of a wholesale grocer and sundriesman cd. on by M. Marks at 106, Whitechapel Rd., E. Nom. Cap.: £3,000 in £1 shares (500 pref.).

COCA-COLA COMPANY. (F. 3064.) Bush House, Aldwych, W.C. 2. Incorpd. in the State of Delaware on Sept. 5, 1919. Formed to take over the bus. conducted by the Coca-Cola Company; to mnfre. and deal in syrups, drinks, and beverages, etc. Number of shares of stock that may be issued: 1,000,000, common stock, without nominal or par value.

PARAMOUNT CATERING COMPANY, LIMITED. (265534.) High Holborn House, High Holborn, W.C. 1. To carry on the bus. of wholesale, retail, and mnfg. confectioners, etc. Nom. Cap.: £500 in £1 shares.

LANSDOWNE CONFECTIONERY COMPANY, LIMITED. (265754.) 102, Brook Street, Ratcliff, E. To carry on the bus. of mnfrs. of and dlrs. in jams, preserves, sweets, etc. Nom. Cap.: £100 in £1 shares.

WELWYN MACARONI COMPANY, LIMITED. (265709.) To carry on the bus. of mnfrs., packers, and mchts. of and dlrs. in macaroni, rice, etc. Nom. Cap.: £1,000 in £1 shares.

E. BIGGINS AND COMPANY, LIMITED. (265744.) 36, Eastcheap, E.C. 3. To carry on bus. as importers and mchts. of coffee, tea, etc. Nom. Cap.: £10,000 in £1 shares (5,000 pref. and 5,000 ord.).

NEWARK CAKE AND CONFECTIONERY COMPANY, LIMITED. (265491.) 93, Balderton Gate, Newark on Trent. To take over the bus. of a confectioner cd. on by J. Willimott at Newark on Trent. Nom. Cap.: £500 in £1 shares.

C. AND J. HOROWITZ, LIMITED. (265518.) To take over the bus. of provision mchts., cd. on at London, Manchester, and Hull as C. and J. Horowitz. Nom. Cap.: £50,000 in £1 shares (40,000 pref. and 10,000 ord.).

BSTE. ALBERTOLLI AND SONS, LIMITED. (265517.) 5, Bath Place, Worthing. To take over the bus. cd. on at 8, Edinburgh Rd., and 2, The Arcade, Portsmouth, and 46, King's Rd., Southsea, as the "Swiss Café." Nom. Cap.: £7,500 in £1 shares (2,000 prefd. ord., 2,530 ord., and 2,970 defd. ord.).

SINGLETON AND CRYSTAL BOTTLERS, LIMITED. (265458.) 26, Birley Street, Blackpool. To take over the businesses of Singleton and Company (Blackpool), Ltd., and the Crystal Mineral Water Company (Blackpool), Ltd., both cd. on in Blackpool; and to carry on the bus. of hotel proprs., mnfrs. of and dlrs. in mineral waters, etc. Nom. Cap.: £20,000 in 10s. shares.

SOUTH COAST TABLE WATERS, LIMITED. (265266.) 55, Temple Row, Birmingham. To carry on the bus. of mnfrs. of and dlrs. in mineral and aerated waters, etc. Nom. Cap.: £3,000 in £1 shares.

BRITANNIA CANNERS, LIMITED. 265332.) Fenning's Wharf, London Bridge, S.E. 1. To carry on the bus. of canning in all its branches, etc. Nom. Cap.: £100 in £1 shares.

E. AND R. VICKERS, LIMITED. (265378.) 24, Hart Street, Liverpool. To take over the bus. of wholesale confectioners cd. on at Liverpool as "E. and R. Vickers." Nom. Cap.: £600 in £1 shares.

DEE FISHERIES (CHESTER), LIMITED. (265377.) 15, Watergate Street, Chester. To carry on the bus. of fish, game, and poultry mchts., etc. Nom. Cap.: £500 in 5s. shares.

BOYDS (SUNDERLAND), LIMITED. (264507.) To take over the bus. of bakers, confectioners, etc., cd. on at Zion St., Lombard St., and Queen St., Sunderland, as "Boyd and Company." Nom. Cap.: £10,000 in £1 shares.

COMPANIES INCORPORATED OUTSIDE GREAT BRITAIN WHICH HAVE ESTABLISHED PLACES OF BUSINESS WITHIN GREAT BRITAIN

NEW ZEALAND CO-OPERATIVE DAIRY COMPANY, LIMITED. (F. 3070.) Farmers Road, Camberwell New Road, S.E. 5. Incorpd. in New Zealand on Nov. 8, 1919. Formed to acquire the undertakings and businesses of the New Zealand Dairy Association, Ltd.; the Waikato Co-operative Dairy Company, Ltd.; and the Waikato Co-operative Cheese Company, Ltd. Nom. Cap.: £1,500,000 in £1 shares.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

Determination of Aluminium *(Continued from page 209.)*

mated as up to 1·16 gr. of aluminium per person per day, are much too small to have any ill effect. The amounts of aluminium which arise from aluminium vessels are estimated from analyses carried out by Massatch to be about 0·1 gr. per person daily.

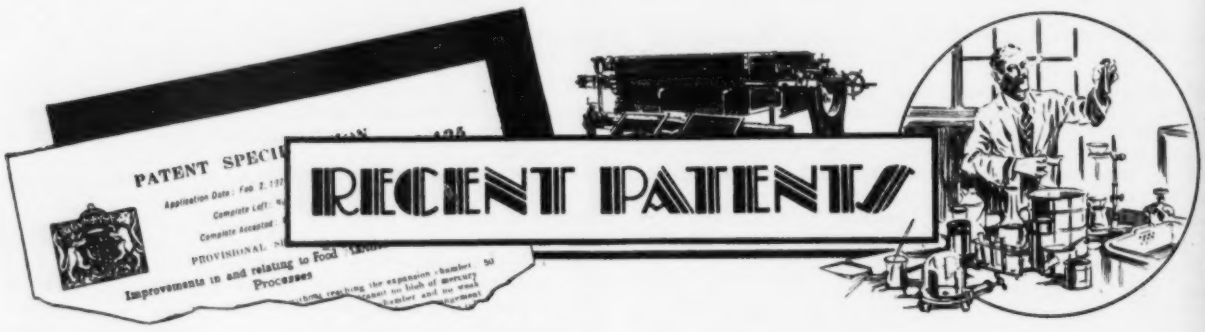
It is seen that the dangers arising from aluminium utensils have been very thoroughly investigated by many workers, on many species of animals; they have also been investigated with equal thoroughness on man. These dangers are non-existent. Clinical reports that symptoms of abdominal pain are relieved by discontinuing the use of aluminium must be ascribed to psychological effects, which are very common in medical practice.

Dermatitis

THE Factory Department of the Home Office reports the following case:

"A flour packer, a girl of fifteen, noticed a rash and irritation of the wrists. On very properly reporting this to the foreman, iodine was applied. This, of course, is a wrong use of iodine and one that would be expected to aggravate to a marked degree an existing dermatitis. Such misuse of iodine is unfortunately not uncommon, and is not, of course, confined to the flour milling industry."

This is an important case which should receive the careful consideration of all those in charge of workpeople in industries where dermatitis is common. Too many people regard iodine as the panacea of all skin ailments, and every effort should be made to prevent the misuse of this valuable antiseptic. Employers who issue First Aid pamphlets might do well to introduce a clause warning against the use of iodine for dermatitis.



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Latest Patent Applications

14177. BARK, W.: Steaming apparatus for food. May 18.

14105. CASTLE, E.: Cooking utensils. May 18.

14226. EDMONDS, LTD., G., and EDMONDS, H.: Mincing, etc., appliances. May 19.

14093. FUCHS, W.: Preparation of powder for making custards, puddings, etc. May 18.

14196. HOTLOCK, LTD., and LOCKYER, E. G. F.: Apparatus for heating, etc., food. May 19.

Specifications Published

373,658. TIVAL, H. L. P.: Preparation of food, medicinal, and other powders, from animal, fish, and vegetable matter.

372,831. HARTMANN, W. W.: Slicing machines.

372,768. REICH, E.: Appliances for heating or cooking food.

372,780. SWIFT AND CO.: Gelatine food products, and methods of preparing the same.

372,865. LYONS AND CO., LTD., J., BUSHILL, J. H., and LAMPITT, L. H.: Drying of food products and the like.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts Published

Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

366,487. **Sugar preparations; confectionery.** FORESHEW, R. H., 36, Chandos Court, Buckingham Gate, London.

A viscous sugar preparation is made by adding to sugar the product obtained by dissolving an innoxious potassium salt such as potassium acetate in a melted innoxious sodium salt such as sodium acetate. The alkalinity of the product may be neutralised by a few drops of sulphuric acid. The viscous preparation may be used for making a coffee couverture or confection along with roasted coffee beans and cocoa butter and/or cocoa butter substitute, or a chocolate couverture along with roasted cocoa beans and cocoa butter and/or cocoa butter substitute. A milk chocolate or coffee paste is made by treating condensed milk with a suitable reagent to precipitate the solids which are mixed with the sugar preparation and cocoa or coffee or a blend of both and cocoa butter and/or a cocoa butter substitute.

366,138. **Sugar.** NAUGLE, J. J., Feild Point Drive, Belle Haven, Greenwich, Connecticut, U.S.A.

Sugar is obtained by extracting a solution of sucrose from a sugar-bearing plant, treating said solution to sucrose to obtain raw sugar therefrom, treating said raw sugar to obtain refined sugar and syrup therefrom and returning said syrup to the process for admixture with the sucrose solution for the separation of additional raw sugar. The process is made continuous. The sugar cane or other sugar-bearing plant is crushed and macerated and the juices are limed, heated, and separated from the scums and mud, which are further treated to separate intrained juices. The juices are then evaporated to a syrup of suitable density to form "meladura," which passes to crystallisers. The mother liquor is passed to a centrifugal for separating raw sugar, and the liquor is sent to a second and third crystalliser for the separation of more raw sugar. The raw sugar from the third crystalliser is used for seeding purposes, while that from the first two is treated with decolourising carbon and filtered to obtain white sugar. The residual run-offs are returned to the first raw sugar crystalliser or to the first evaporators. Details of crushing, liming, defecating, settling, evaporating, and filtering are described.

365,586. **Food preparations.** Hellerud, R., 79, Ullevaalsvei, Oslo, Norway, Naamlooze Vennootschap Internationale Gradin Maatschappij, 92, Rokin, Amsterdam, and Vitacream, Ltd., 48, Mark Lane, London.

Emulsions containing protein material and fat are treated to increase their stability and lower their viscosity by passing them through successive heads or valves of a homogenising machine. At the first head a comparatively high pressure is employed—*e.g.*, above 100 atmospheres—and the following head or heads a substantially lower pressure. Suitable pressures are 130 atmospheres and 70 atmospheres respectively; the pressure at each valve should be sufficient to produce homogenising effects. In the case of fatty emulsions containing casein or egg-protein as the emulsifying agent, the first homogenisation at least should be performed at a temperature of not less than 60° C. When egg-protein is used, the emulsifying agent may consist of the whole egg yolk or the residue left after extraction with ether and chloroform. Specification 341,414 is referred to.

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